RAILROAD GAZETTE

FRIDAY, JULY 30.

Contributions.

"Whistling Too Much."

TO THE EDITOR OF THE RAILROAD GAZETTE:

Noticing in your "Scrap Heap," July 23, the following:

"*Whistling too Much.*—Passengers have been complaining that engineers of Erie freight trains have formed the bad habit of blowing the whistles unnecessarily when passing passenger trains. The result is an order forbidding all whistling when passing such trains except when it is necessary for safety. The order has just taken effect."

It occurred to me that some one had blundered, either the reporter or those who issued the order which has "just taken effect."

On page 75, Rules and Regulations Approved June, 1883, you will find the following for the instruction and guidance of the engineers: "In passing trains on double track or switches they must not sound the whistles unless the same be absolutely necessary as a signal to prevent accident." Why should orders be repeated instead of being enforced?

W.

The Illinois Central's Policy.

[*Illinois Central Railroad Company.*]

CHICAGO, July 22, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your editorial headed "A Proposed Great Western Traffic Association," published July 16, you use the following expression:

"Until the Minnesota & Northwestern in connection with the Illinois Central was able to take a little business and spoil a great deal"—your expression having reference to St. Paul and Chicago traffic.

It is an unjust and unwarranted assertion, for the reason that the Illinois Central Company entered into the St. Paul and Minneapolis traffic on a basis different from that of any other railway under similar circumstances. It maintained rates, passenger and freight, from the opening of the through route, even when the associated lines were cutting rates and destroying the value of the traffic. The Illinois Central management does not destroy but conserves railway revenues.

E. T. JEFFERY, General Manager.

[We did not mean to say that the new line by way of the Illinois Central and the Minnesota & Northwestern *had* "spoiled a great deal of business;" we have never heard that it has; we meant simply that its *ability* to spoil a great deal of traffic added to "the difficulty of establishing and maintaining a coöperative association of the railroads of the whole district." It is, we take it, the ability to "spoil" traffic rather than the traffic which it actually gets which makes old lines yield a new competitor what is properly its due.

There is certainly a possibility of using this power to "spoil" business wrongfully, and we do not wonder that Mr. Jeffery should resent any such imputation on the Illinois Central. Its management has won the reputation of not destroying but conserving revenues which he declares to be its policy.—EDITOR RAILROAD GAZETTE.]

The Denver Convention of the American Society of Civil Engineers.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the accepted sense of the term, that a convention is a meeting for deliberation and discussion, the Denver convention of the American Society of Civil Engineers might be made as brief as the chapter on snakes in Ireland—there was none. For this no one was to blame, the intense hot weather, ranging from 95 to 100 degrees in the shade throughout the three days of the convention, having destroyed all real disposition to discuss anything more serious than a mint julep in all those present. In the original sense of the word, however, of a coming together, the convention was one of the most successful ever held, considering how far most of the members had to travel to get there, and the real purpose of such gatherings, to throw members of widely separated residence together, create a sense of unity and acquaintanceship, and enable all those present to have a good time for a few days was perhaps never more successfully fulfilled.

The Society has never before held a convention at such a distance from its centre of gravity as Denver, and it began its preparations to get there by an effort to go there in style and in comfort. The d companies showed their usual courtesy to the Society by cordially agreeing to haul them in a body by special train at a nominal price per train-mile to cover actual cash outlay, and the New York Central in particular, over which it appeared desirable to pass for the convenience of the members, extended a most unusual courtesy in permitting a mixed train of Wagner sleepers and Pullman hotel cars for the trip, the train having been, in fact, the first one since the early days of sleepers, which every one has forgotten, in which Pullman cars, other than private cars, have been hauled over the New York Central lines. The entire train of four sleepers, as well as extra sleepers from Chicago and St. Louis, was chartered for the round trip, and the peculiar arrangement for a mixed train was entered into with the expectation that the only arrangements which it was possible to make for serving meals on the train for so large a party would add to the comfort and pleasure of the trip. As a matter of fact, this arrangement proved a dismal failure, and the quality of the entertainment, which some of the committee had imagined they had arranged for, proved very different from that which they actually received; but with all these draw-backs, for which, perhaps, no one was entirely to blame, the trip out to Denver was an enjoyable one, occupying, as it did, all but a few hours of three full days, affording ample time for the greater portion of the "discussions" which took place at the Convention.

A noticeable feature of the trip, to a railroad man, was the very irregular distribution of the time required to get over the first and last half of it. From New York to Chicago, a little less than 1,000 miles, the run was made as a second section of the limited express in 25 hours, or at an average rate of nearly 40 miles an hour. From Chicago to Denver is a few miles over 1,000 miles (1,026 miles), and one might rationally expect either that the speed between stations would be slower or that the average time would be something like the same. On the contrary, the running time of the regular train is some 43 hours, while the actual time made by trains between stations is rarely much less than 40 miles per hour, and not unfrequently nearer to 50 miles. The evident conclusion from these facts is that something like 18 hours is spent in stopping and starting and standing still to 25 hours in motion, which is not a cheerful way of traveling, as the American Society had some occasion to realize, even in their special train, which made the run in 2½ hours less time. A traveler over the line for the first time is somewhat struck by the length of time it takes to get over 1,026 miles with 40 miles per hour running speed, and does not particularly enjoy it. However the road is in fine order, and the surrounding country, if not particularly picturesque, is full of "local peezness" actual and prospective, while the view of the Rocky Mountains in approaching Denver is sufficiently picturesque to satisfy any reasonable requirement. In all some 50 members and 25 ladies left with the train from New York, and nearly 50 more were taken on at Chicago and in a special car from St. Louis and at various minor points. With the members already at Denver or reaching there in other ways the entire party attending the convention numbered about 180. Mr. Robert M. Stanton, of Denver, presided over the convention, and to him and the members of the committee of the Denver Society of Civil Engineers assisting him the society was greatly indebted for the successful arrangements at Denver and for the subsequent trips through Colorado.

The convention proper of the Society opened on the afternoon of a day when the thermometer touched 100 degrees in the shade, and it is no particular reproach to them that the proceedings were somewhat languid. But one paper was read, one by Lieut. R. L. Hoxie on "Excessive Rainfalls considered with reference to Populous Districts," and an interesting and careful paper it was, full of records of extraordinary storms which amply proved that the old rule for proportioning sewers for a rainfall of an inch per hour was sadly defective. Records of marvelous rainfalls, ranging from ¾ in. in 5 minutes to 3½ in. in one hour and 7.92 in. in 56 hours were given in great abundance, showing that they are by no means unusual occurrences. Few more careful papers have ever been presented before the Society, but the subject is of such indirect interest to railroad men that fuller summary is unnecessary.

The discussion bade fair to be conspicuous by its absence when Treasurer Croes came to the rescue, and after the initial friction had been overcome it rolled on briskly some little time, drifting away from the subject of the paper, however, to the question of rain on the Western plains. The most interesting definite fact brought out was one stated by Mr. Blickensderfer, of the Union Pacific, that there appeared to be oscillations of rainfall extending over a period of years, so that many of the hopes arising from apparent increase of rainfall in the far West were probably delusive. In evidence he mentioned that in 1869 the level of Salt Lake had risen so as to cover fence posts set 10 or 15 years before, a result universally ascribed to irrigation, but a year or two later the water level began to recede, and has now resumed the level it had in the first place, very nearly. "The society then adjourned" to the soda-water fountains.

The evening was devoted to "welcoming" speeches by the Governor of the State, Mayor of the city, and President of the Board of Trade, responded to in a somewhat unpracticed but sufficiently felicitous manner by President Flad, Vice-President Keeper, and ex-Vice-President Green. This was at a public meeting in Denver's new and very tasteful and pretty opera-house, and the "wealth and beauty" of Denver were well represented, the house being full. It is quite unnecessary to summarize the speeches, except that the annual address of President Flad was very good. He dwelt more particularly on the necessity of better city and sanitary engineering, but also renewed at some length facts which are for the most part sufficiently familiar to railroad men in respect to railroads. He referred specially to the Burlington brake tests as a notable example of the greater disposition of railroads to look into technical matters more scientifically and thoroughly, and ended by an earnest appeal in favor of the adoption of the metric system.

The forenoon of the next day was devoted to a drive about the city, the citizens of Denver turning out for the most part with their own carriages to drive the society about in parties of three or four; and the afternoon session—with the thermometer still high in the nineties—was devoted to the paper by Mr. A. M. Wellington on "The American Line from Vera Cruz to the City of Mexico, *via* Jalapa, with notes on the best methods of surmounting high elevations by rail." As a separate summary of this paper may appear in the *Railroad Gazette*, it need not be attempted here. The summary preceding the paper, giving a general idea of its scope, was this:

"The elements which appear to make the mountain grade of this line particularly worthy of description are these:

"*First.*—It is believed to be by far the longest continuous grade line ever located: 116.9 kilometers (72.64 miles), having been located on an unbroken 2 per cent. grade (105.6 ft. per mile), rising in that distance from elevation 600.4 ft. (183 meters) to elevation 7,923.3 ft. above the sea (2,415 meters). The accompanying Plate I. shows graphically the extent of the contrast in this respect with some of the other great inclines of the world.

"*Secondly.*—It is believed to be on the lowest rate of grade, by about 2 per cent., ever successfully attempted for accomplishing within a limited distance, either by a continuous grade line or otherwise, a rise of over one-half as much as was attained on this line. The grounds for this belief also are shown in the accompanying Plate I.

"*Thirdly.*—The line is believed to be, by probably one-half at least, the cheapest line per mile which has ever been actually located, with equally favorable alignment, for attaining within a limited distance as much as one-half the rise actually attained by this line, either by continuous or broken grade lines, on any rate of grade. As for this, Table 1, Plates III. and IV., and the general knowledge of engineers is the only evidence that can conveniently be appealed to, or which it is worth while to attempt to present.

"*Finally.*—It appeared that the manner in which the line was obtained might have a certain instruction and encouragement to those who may be dismayed, as was the writer, by having similar problems of unusual difficulty suddenly thrust upon them, and it was also desired to give, in connection with the description of the line, certain conclusions which the observation and experience of the writer has indicated—not only on this incline, but on eight or ten others of considerable rise, which have been located or relocated in part or whole under his supervision, aggregating over 24,000 vertical feet—in regard to the most advantageous and economical manner of dealing with great inclines, under which may be classed anything exceeding 1,200 to 1,500 ft. of vertical rise."

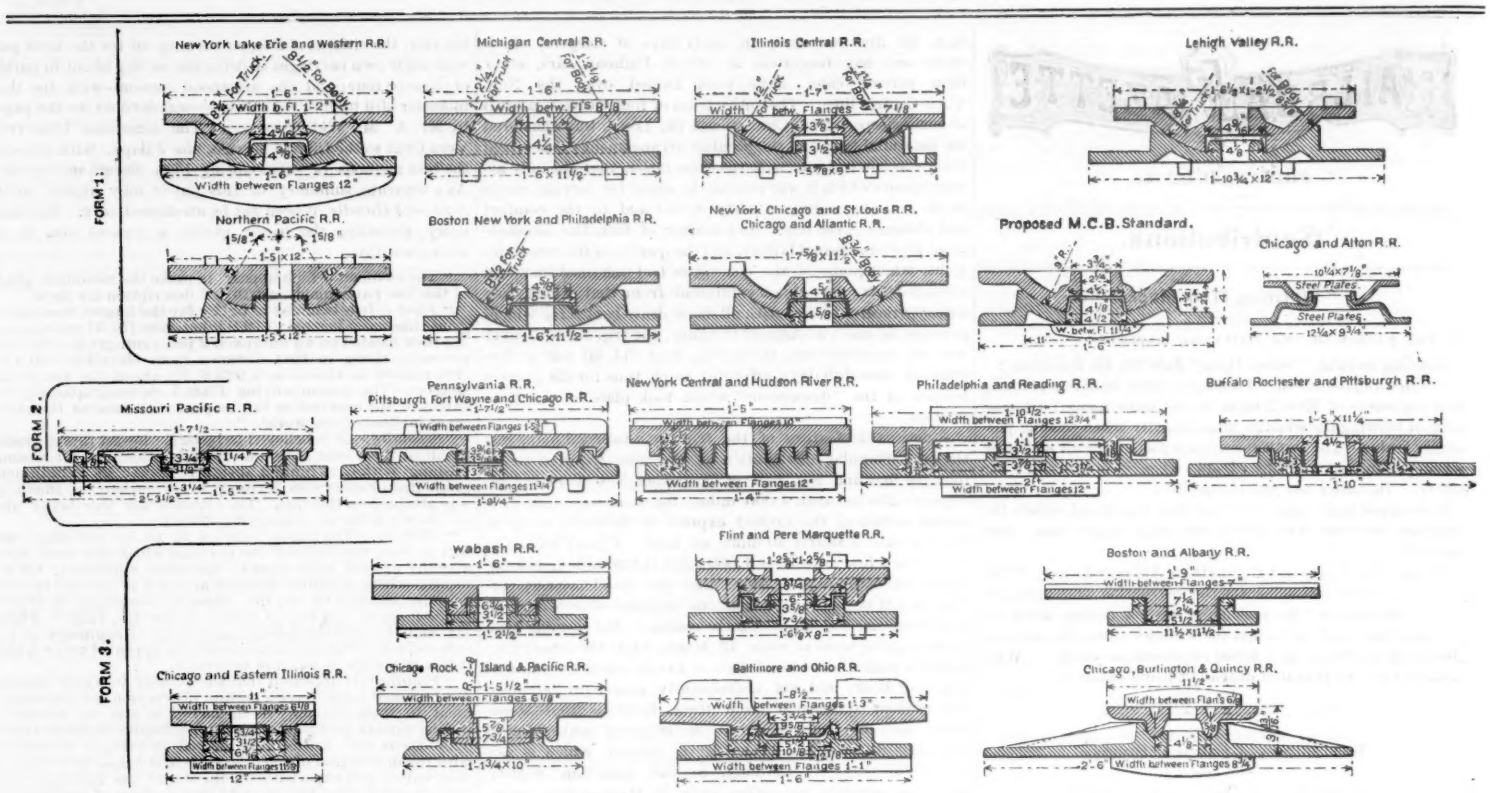
For such purposes Mr. Wellington advocated an adaptation of the modern cable system, working at very slow speeds on very steep grades, wherever the traffic was large, and a switch-back system with grades laid out in a peculiar way so as to neutralize the disadvantages of the stop and enable an engine to haul as great loads on the same grade as if it were continuous, when the traffic was light. It was too hot and too near dinner time for any discussion to follow when the reading of the paper was concluded, and the Society adjourned instead to examine a new electric street railroad plant, in pursuance of an accepted invitation. It presented many interesting and ingenious features, and may possibly be the coming rival of the locomotive and the horse-car horse, but as the cars are as yet run over one block only and the proprietors are not yet ready to publish illustrations of their device, it is unnecessary to attempt further description. When so many bright men are at work studying the problem of electric transportation, and most of them with some partial success, there can be little doubt that if there is really anything in it it will be discovered before long. The lack of success so far naturally excites some skepticism.

In the evening an animated discussion arose over Mr. Wellington's paper, which was the only business transacted besides "announcements" of the Secretary in respect to the true business of the convention and the excursions to follow it. The suggestions made in the paper were new to most of those present, and naturally led to a flood of questions and objections, which the author was compelled to answer in rapid succession as best he could, and however good or bad his argument it is but fair to say that he was not defeated on the floor. It was one of the most animated discussions of the kind which has ever taken place at a convention,

The morning of the following day was devoted to the business session of the Society. The Committee on Standard Time reported that the 24 o'clock system was going into use in the far Northwest and other facts which have already appeared in the *Railroad Gazette*. The Committee on the Form of Rails and Wheels reported that a paper on the subject was in preparation by one of its members, which it was thought best should be presented to the Society for general discussion before a definite report was attempted, and therefore asked to be continued. The Committee on Tensile Tests of Cement submitted a report of no little technical interest to those specially interested in cement, but which it seems unnecessary to summarize for general perusal, as the subject is being beaten out rather thin.

The more important action of the meeting was with reference to the organization of the Society. The committee on that subject had been unable to agree, and, being scattered all over the country, it seemed improbable that they ever would be able to agree. They were therefore on motion discharged and the subject referred to the Board of Direction, with instructions to ascertain the views of the members and of kindred engineering societies. A resolution requiring the chairman of the nominating committee to be a resident member and ex-officer of the society, submitted by Don. J. Whittemore, was adopted, and Charles Macdonald of New York elected. Mr. Robert M. Stanton, of Denver, who presided over the convention and won golden opinions by the care which he had shown in that capacity and as Chairman of the local committee to make the convention a success, and Messrs. H. Stanley Goodwin, Desmond Fitzgerald and Maj. B. M. Harrod completed the committee.

The afternoon session—the weather being very hot—was chiefly devoted to listening to the brass bands in the street outside, and rushing to the windows whenever the frequen



FREIGHT CAR CENTRE-PLATES.

shouts of laughter arose to witness various donkey and bicycle races which were going on most of the time in the street outside in celebration of the glorious Fourth, and which made the reading or discussing of papers physically impossible. At last the great procession of the day came by, and some one had presence of mind enough to pause in his progress to the windows to move that the Society take an intermission to see it, which the Society had already moved to do in a body. It was no one's fault, but the proceedings of the last session of the convention were almost a farce. But one paper of special interest to railroad men was read—a supplementary one, by Mr. E. B. Dorsey, on "English and American Railroads Compared," in which a new series of tables was given; assuming to prove that in certain details the English roads are far behind American practice, as notably in the average of freight train load, even on roads of fairly analogous traffic.

The Society then adjourned, and after dinner held a reception at which, by an unfortunate chance, the Governor of the State, Mr. Eaton, and his wife appeared at the hour set and found no one to receive them except one stray lady and a member who were fortunately equal to filling the gap for the time being. The next day the excursions began, which extended over the following week. The first was to Greeley and return, enlivened by a brisk drive, which most of the party were able to enjoy, for some miles into the country. The second was to Georgetown and return, through the Clear Creek cañon, and passing over the only bridge spiral in the world, which is certainly a fine piece of engineering. The second was to Leadville, over the marvellous "high line," passing over three successive summits of 10,000 to 11,300 ft. The fourth was from Leadville to Manitou Springs, passing through the Royal Gorge of the Arkansas, with—it will appear in the official account, no doubt—a side trip over the Marshall Pass. Only a few made the trip, however, the Society as a body having been, with the heedlessness of crowds, guilty of a discourtesy which it is safe to say not one of them in his individual capacity could have been coaxed into by any temptation. After traveling 4,000 miles to see Colorado, and after having been tendered (practically at its own request) and accepted the courtesy of a special train over Marshall Pass and to Manitou, the members of a sudden were seized with a desire to get somewhere to "take mine ease in mine inn," and some of them having begged anew and obtained the privilege of going by the regular train free, three-quarters of the party, including every one of the officers, and every one of the ex-officers but one, abandoned the special train and piled on to the regular, leaving it to one ex-officer and one plain member to express the thanks of the Society to the officers of the road for hauling the long train of almost empty cars, to which they had attached their own as an additional compliment, in order to afford an opportunity which it might have been supposed a body of civil engineers who had come so far would at least deem worthy of paying three hours of ease at an inn for that of seeing gratis one of the finest triumphs of engineering and grandest bits of scenery on the continent! Let us drop the curtain. It was not creditable. It was distinctly discreditable, and mortifying enough to those who were left behind to explain it on the almost empty train; but it was not intended nor foreseen. Each for himself went his separate way, and did not realize what the aggregate was to be until too late.

Three days were then spent at Manitou Springs, and the party then returned as it had come, in the special train chartered for the trip. As a whole the convention was a success. That the technical proceedings were not more animated and full was chiefly the fault of the weather, which made it simply impossible.

Freight-Car Centre-Plates.

The accompanying illustrations are prepared from blue prints submitted to the Master Car-Builders' Convention at Niagara Falls by the Committee on the Adoption of a Standard Freight-Car Truck. The Committee found that the adoption of a standard truck would not enable one pattern of truck to be easily used under all freight cars, for the simple reason that the styles of centre-plates and side-bearings in use differed on almost every road.

A detailed illustration of the proposed standard truck, centre plate and side-bearing has already appeared in these columns.* The present illustration will serve to show how widely centre-plates differ, and how impossible it would be to build one truck that would take all the standard centre-plates used on even a few of the most prominent roads.

It will be seen that the centre-plates may be arranged in three groups, according to form.

Form 1 has the bearing in the form of a portion of a sphere, with an annular boss round the centre-pin. This is the form in most general use. The two plates form a species of ball-and-socket joint, and the truck, on a rough road, can tilt either in a fore-and-aft direction or laterally without affecting the body of the car. The centre-plate under the passenger equipment of the Pennsylvania and many other roads is similar in principle, but is inverted, the radius being struck from below the centre-plate. At the convention, Mr. L. Garey suggested this as an improvement on the form proposed by the committee, arguing, very justly, that dust would not be so apt to lodge and get into the working surfaces.†

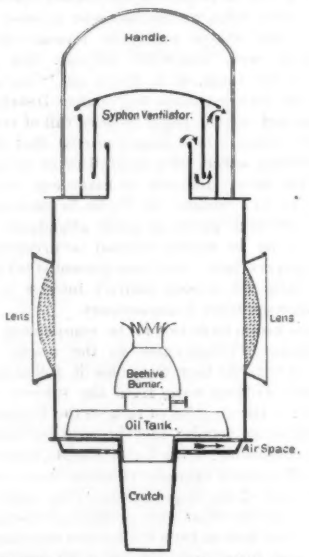
Form 2 has a bearing shaped like a flat-edged ring, large enough to support the car body horizontally, without the aid of side bearings.

Form 3 has as a bearing surface a small ring, either rectangular or rounded in cross sections.

As will be seen from the illustration, the Committee preferred the first form, and recommended one of that type for general adoption as the M. C. B. standard.

* See *Railroad Gazette*, July 19, 1886.

† An illustration of the Pennsylvania form of passenger centre-plate will be found in the *Railroad Gazette*, August 22, 1884.



Watson's Locomotive Signal Lamp.

Watson's Locomotive Signal Lamp.

The accompanying illustration represents a form of locomotive signal lamp invented by Mr. W. M. Watson, of the Grand Trunk Railway. The improvement is particularly aimed at rendering locomotive lamps less liable to go out while the engine is running.

It was found on investigation on the Grand Trunk that this evil proceeded mainly from three causes:

First. The beehive burners allowed the wick to lower down.

Second. Want of sufficient air to feed the flame.

Third. The top ventilator having too straight a draft, the light was apt to be blown out when the engine lurched.

The syphon ventilator at the top of the improved lamp is designed to remedy the two last named evils. The hot air is compelled to bend round in the form of the letter S, and so cannot be directly affected or reversed by any vertical movement of the engine. At the same time the parts can be easily taken apart for cleaning when that is necessary.

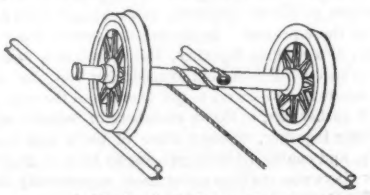
The bottom of the lamp is made in two parts with an air space between. The air enters the first part near the crutch, and travels horizontally 2 in., when it enters the lamp through the second bottom close to the sides. All the air passages are free, no gauze or other obstruction being used.

The first lamp of this pattern was subjected to a severe test on Grand Trunk engine No. 223, with, we understand, very satisfactory results.

Any further particulars may be obtained by addressing Mr. W. M. Watson, Grand Trunk Station, Belleville, Ontario.

A Mechanical Conundrum.

The accompanying illustration represents a mechanical puzzle, which is new to us, and may prove interesting to many of our readers. A pair of car-wheels and axle are resting on a piece of level track. A rope made fast to the axle and wound round it as shown. If the rope is pulled in what direction will the wheels run? Will they move away from the spectator or toward him?



A Mechanical Conundrum.

Further, if the track is inclined, say 1 in 10, the highest part of the incline being nearest the spectator and the end of the rope, and a considerable strain being exerted on the rope, in which direction will the wheels move, up or down the incline?

We shall be happy to receive answers to the above queries.

The Burlington Freight Brake Tests.

Continuing our report from last week, it is still impossible for us to give the official figures of the runs. They have been in part made up, but it is not desired to give them out until all the various records taken can be compared together. Pending their receipt and publication we must again caution our readers that but little value is to be attached to the records of runs published last week and below, and that conclusions should not be drawn from them nor computations of efficiency attempted.

The substance of this week's results is that the American brake, which showed very good results with 25-car mixed trains, both in smoothness and quickness of stops, failed badly in the 50 empty car test, not from lack of efficiency, but from the violent and repeated shocks experienced at the rear of the train, which were not only quite inadmissible in practice, because of their effect on stock, fruit and other delicate freight, but which caused many breakages of draw-bars and other parts and very numerous brake beams. These breakages are chiefly confined to the rear of the train. On the last test they broke the train in three places at the beginning of the stop.

The Widdifield & Button, it will be remembered, which is a friction buffer brake, failed in a similar way, but rather worse, on the 25-car tests. It would unquestionably be highly dangerous to attempt a stop with that brake with 50 cars.

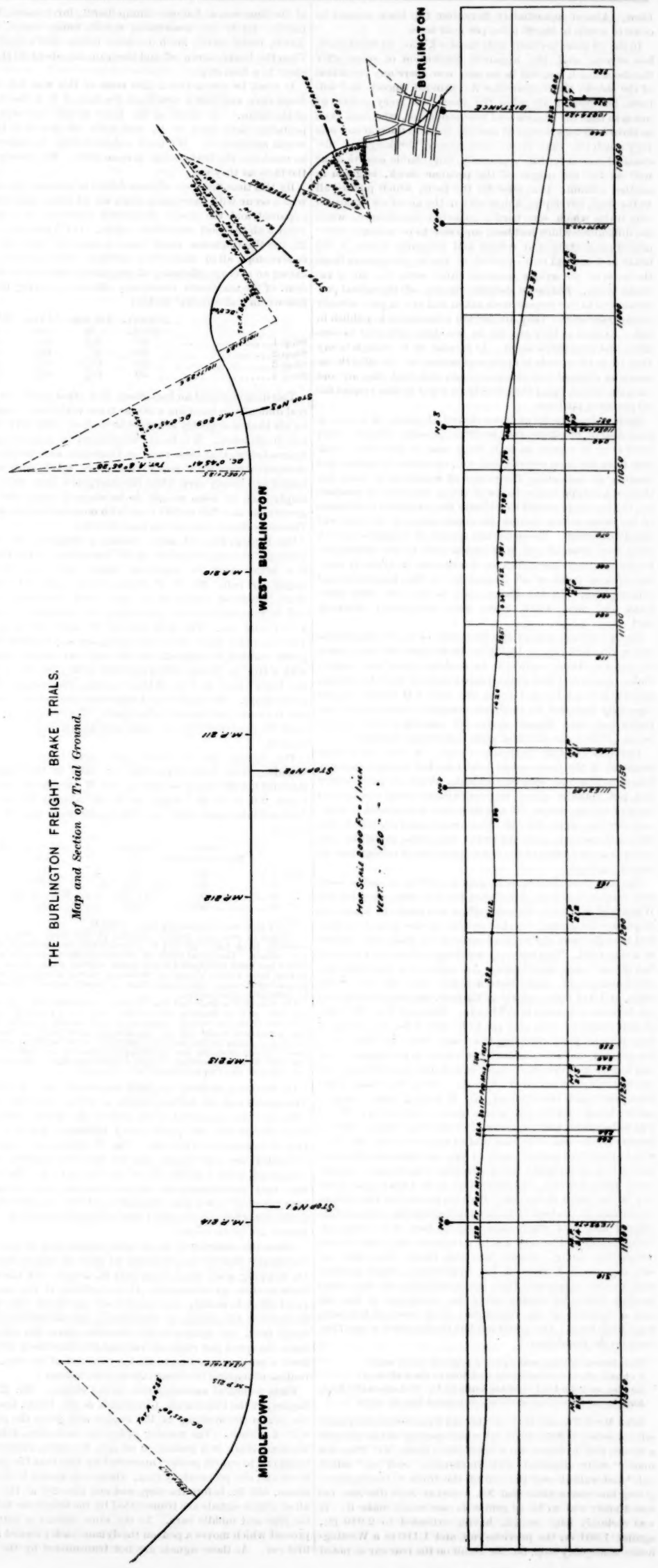
The Rote brake has not yet completed its changes so as to enter the test at all. As it differs from the American only in the mechanism for throwing the brakes in and out of gear, applying the brakes by direct pressure of the buffer, there is no apparent reason to hope for any different result in its case from that with the American.

In the opinion of those most competent to judge who are present at the tests, they have developed a very serious defect in the buffer brake type, which apparently cannot be used throughout any train of any length without producing violent and dangerous shocks throughout the train. Pulsations of brakes on, brakes off, run through the train, because the very fact that a brake has gone on tends to throw it off again by its own retardation. This effect is much less marked in the middle of the train, but the diagrams (full engravings of which we shall publish) indicate that it always exists, more or less.

The buffer brake people are therefore practically ruled out from further 50-car tests, and have in effect admitted that the defect of their apparatus is irremediable, by uniting in a request that a special test be made of all brakes on the ground with trains of 50 cars with the rear 20 cut out. It is probable that this test will be made during the coming week, and there is at least a very good chance that the behavior of the buffer brakes will be much improved, and that they will make stops closely rivaling those made by the continuous brakes under the same conditions.

These unexpected results have strikingly proven the sagacity of the Chairman of the Committee, Mr. Godfrey W. Rhodes, in insisting that the test trains should be 50 cars long instead of 25, in the face of some opposition both from the brake companies and from various experienced railroad men, all of whom took the ground that "25 cars would show what the brakes could do just as well as 50," as one of the most prominent of them declared. Had this been assumed, the buffer-brakes, at least the American brake, would have come out of the test with flying colors—for its behavior in that test was thoroughly good, except for the great number of broken brake-beams—and a most dangerous defect have remained undiscovered. Whether the railroad public will take the view that a brake which will work well on 25-car trains, and on the front 30 of 50-car trains, is good enough for practical requirements, remains to be seen. Its retarding power, for a given maximum pressure on brake-beams, cannot average more than about two-thirds as much as with continuous brakes, because of the undulations of pressure referred to. With a number of unbraked cars behind, experience may show that there is less undulation.

In the meantime the Westinghouse and (less completely) the Eames companies have done much to increase the confidence of the public in the satisfactory working of continuous brakes on very long trains, by their tests during the past week. The Eames opened the ball with 50 empty car trains, making throughout their three runs of four stops each "emergency" stops, made as quickly as the air could do it, without regard to anything but stopping—which naturally resulted in more or less breakage, and ended by throwing a truck off the track. The Westinghouse then entered the field, and out-Heroded Herod in the quickness and violence of the stops. Their tests with 50 empty car trains began on Monday, July 19, making "emergency stops," as had been the rule in all the tests heretofore. Very quick stops were made, as will be seen, and without any disagreeable effect whatever in the front car, but in the middle car there was a shock of no little violence, and in the rear car a terrific blow, bruising two or three persons, including the present writer quite severely, and giving all in the car a violent shock, which detached them at once from the hand-holds which they were all grasping, braced for the blow, and threw them in more or less of a heap in the front end of the car. The violence of the blow can be better appreciated when it is stated that in the middle car, where it was comparatively mild, a tolerably heavy tool box, which no ordinary working shock would move at all, was moved some 12 ft. along the floor. The telephone bell gave the regular signals, so that the instant of application of brakes could be known, and the way in which the shock came was this: For some 8 to 10 seconds after brakes were applied on the engine no effect whatever was felt, nor did the speed of the train seem to be appreciably checked. Then, without the slightest warning, came the



THE BURLINGTON FREIGHT BRAKE TRIALS.

Map and Section of Trial Ground.

blow. Almost immediately thereafter the train seemed to come to a stop in the 20 miles per hour tests.

In the 40 miles per hour tests the shock was, as heretofore, less severe, and the apparent diminution of speed after the shock much less, but in no case was there any repetition of the shock; the motion after it continued smooth and uniform, but even at 40 miles the shock was very severe, so much so that the experienced rear conductor, who had been in three collisions, declared that the shock in the rear car was very much less than from "emergency" braking. A mechanical reason for this apparently improbable assertion, as well as for the origin of the peculiar shock, is given in another column. It at least fits the facts, which puzzled all at the time, developing a difficulty in the use of air brakes on long trains which was hardly expected in advance, while the difficulties which had been supposed to be serious—slowness of application and release and irregular action of the brake at front and rear—proved, so far as yet appears from the tests, of no serious moment, either with the air or vacuum brake. Extended definite records of the actual performances in this respect were taken and are in part already in our possession. They are far too voluminous to publish in full. As soon as they are all in we shall endeavor to condense and summarize them. At present it is enough to say that 12 to 15 seconds to apply and release on the fiftieth car seems an attainable working average, and that the air and vacuum brakes stand very nearly on a par in this respect for all practical purposes.

Such violent shocks as those described mean, of course, a good deal of breakage and no little possible danger. Full records of all repairs on each train may be hereafter available from the shop records, and will, no doubt, be instructive reading as indicating the points of weakness in cars, but there is a certain large chance of doing injustice in comparing the breakage record to estimate the comparative violence of the brake action, because the construction of the cars was widely different. The particular points of weakness in each train were brought out in a curious way by the breakages. In the Westinghouse (Chicago, Burlington & Quincy) cars, the weakest point of all seemed to be the king-bolts and centre-plates. In the Eames cars it was the draw-gear, links and pins, which latter were continually dropping out.

On the second stop of the first run of the Westinghouse cars a king-bolt (1¾ in. by 25 in.) broke short off like a piece of cast-iron, being subjected to a shear from the centre-plates, which had first jumped apart slightly from the shock, and which had a beveled form like half a U which seemed especially designed to facilitate complete separation if the plates had once jumped apart far enough to catch on the bevel. This form of centre-plate is no longer standard.

Two doses of this was quite enough. It was more than doubtful if the train would hold together through another trip so as to avoid serious accidents. Various parts which had not actually given way on almost every car showed signs of serious strain. It was therefore determined to make easy service stops for the final empty car run, which was done satisfactorily, but with rather long stops, as will be seen below from the notes of the third run of the Westinghouse 50 empty car tests.

The American then came in with an effort to make some easy service-stop runs, developing the fact that, as with the Widdifield & Button, the more effort was made to make the stops easy the greater was the number of shocks and lurches, and that the most shocks of all came as the train was almost at a standstill. This was very amusingly illustrated in their last 50-car "easy stop" runs. As eight cars had been disabled and set out, there were actually only 42 cars in the train, and 9 of these, mostly at the rear, had single trucks cut out because of broken brake-beams. Manager Geo. H. Poor, of that company, who may safely be said to be as popular a man with all those attending the brake tests as there is on the ground, and who has done not a little to predispose every one to give his brake the benefit of a doubt, was riding in the car watching the action of his brake. Stops No. 1 and 2 had been pretty bad, the order on stop 2 having been—bump—lurch—bump—lurch—two severe bumps—and a stop. No. 3 was to be easier, and the order of events was bump—lurch—bump—lurch—none very bad, and an apparent stop. Mr. Poor was in the act of getting ready to step out of the side door and take a look at the train, when a terrible whack came, apparently from nowhere, and threw him all in a heap against the box in the corner of the car. Perhaps no one but the present writer caught the look of mingled astonishment, indignation, disgust and grief which came upon his face, as if a long-suffering father had been struck by a recreant son, and it was irresistibly funny. Hardly was this fairly over, and before any one had resumed his equilibrium, when another whack came, apparently from the surrounding air, and added insult to injury by causing one of the occupants of the car (not a member of the committee) to sit down on him with some little force. One could not but be reminded of the "Society on the Stanislaus:"

> "Then Brown of Calaveras raised a point of order, when
> A chunk of old red sandstone took him in the abdomen;
> And he smiled a kind of sickly smile and c rled up on the floor,
> And the subsequent proceedings interested him no more."

Like Mark Twain's lady in the San Francisco earthquake, who objected to the wall of her room opening on the side like a mouth and dropping out a brick like a tooth, Mr. Poor is a man "easily disgusted with foolishness," and he "sidled out," and walked over the top of the train to the engineer, giving him instructions that No. 4 stop at least (the last before dinner) was to be as gentle as care could make it. It was certainly long enough, having extended to 2,919 ft., against 1,901 on the previous run, and 1,116 in a Westinghouse emergency stop, but the result on the rear car as noted at the time was as follows: Bump (hard), lurch (easy), bump (hard), lurch (no description noted), bump (easy), lurch (hard), bump (hard), lurch (no note), bump—and a dead stop. Then the brakes threw off and the train ran about 30 ft., and came to a final stop.

It must be remembered that none of this was felt in the front cars, and but a moderate fraction of it in the middle of the train. A third of the train at the rear will very probably save most of it, and with 25 cars it is hardly worth speaking of. We must not, therefore, be understood to condemn the brake while it is on trial. We merely give the facts as they are.

By this time the need of some device to measure the shocks which occur with emergency stops of all trains had become apparent, and the device illustrated elsewhere was improvised with the most successful results. On Thursday, July 22, the Westinghouse made some wonderful runs, the successive stops, all of them very excellent working stops, indicating an average efficiency of something like 80 or 85 per cent. of the maximum emergency efficiency, having been as follows, in "slidometer" inches:

	Approx. speed.	1st run, in.	2d run, in.	3d run, in.
Stop 1	20	$5\frac{5}{16}$	$2\frac{1}{4}$	$3\frac{3}{8}$
Stop 2	40	$2\frac{1}{4}$	$0\frac{1}{16}$	$0\frac{1}{32}$
Stop 3	20	$0\frac{3}{8}$	$0\frac{1}{32}$	$1\frac{1}{8}$
Stop 4	40	$0\frac{15}{16}$	$0\frac{3}{8}$	$0\frac{1}{2}$

This demonstrated an important fact—that there was no real difficulty in handling a 50-car train with loose couplings by air brakes as gently as might be desired, with very slight loss in efficiency. It is to be remembered in comparing the figures below, that these runs, on Thursday, with the previous emergency runs with empty cars, were made with mixed loaded and empty cars, while the emergency runs were with empty cars, the total weight to be stopped being 500 tons greater, or as 1,195 to 695 tons, with no more braking power. Therefore direct comparison leads to error.

On Friday, July 23, after making a change in its brake leverage, as noted elsewhere in the description of the foundation brake gear, the American brake was given its third empty car run. Mr. W. P. Shinn, whose series of tests of short American trains which gave such favorable results will be remembered, was present at this test, which was not a very long one. The first stop at 20 miles per hour was phenomenally short, although the figures as yet given to the public cannot be trusted, but the rear car opened the ball with a 16¼ in. bump, following with a 20¼ in. lurch, when the train broke in two at three points, suspending further proceedings. Manager Poor declared that he had had enough, and the train was hauled in the yard. The competitive stops with 20 rear cars cut out must now be awaited with great interest.

The Eames 50-car mixed runs were then taken up. Whether from lack of practice or skill in the engineer, they did not do nearly so well as the Westinghouse, making many "8 to 13 in." stops, as it has already become the fashion to designate them, as will appear from the following record:

	Speed. Miles per hour.	1st run. In.	2d run. In.	3d run. In.
Stop 1	20	$1\frac{9}{16}$	$0\frac{1}{16}$	0§
" 2	40	$0\frac{1}{16}$, $13\frac{1}{4}$, $0\frac{5}{16}$	omitted†	$7\frac{1}{2}$
" 3	20	$7\frac{11}{16}$, $0\frac{3}{16}$	$0\frac{1}{32}$, $8\frac{1}{2}$, $4\frac{7}{8}$	$9\frac{5}{8}$
" 4	40	$0\frac{3}{32}$*	$3\frac{1}{4}$‡	

* This stop was excessively long, 3.665 ft.

† Broke in two just before coming to the stop. Train came speedily to a halt with 324 ft. between the two sections, with a 5 in. shock. The great value of the automatic feature in a train brake has been illustrated many times during these tests, there having been 12 or 15 cases of breaking in two already, of course under far severer conditions than ordinary service, but withal in unusually good order.

‡ In this stop a draw-bar was broken, requiring the car to be cut out, and on starting out for the next run a pin broke on the fifth car from the engine, causing a great shock in front, which the automatic brake did not apparently have time to prevent, the heavy train behind having closed up on the head, or the head been thrown back by the quick application of the brakes upon the rear, badly shattering a heavy cast draw-bar. The car was cut out and the run continued with 48 cars.

On Saturday nothing specially important was developed. The special test of drifting down a hill at uniform speed with 50 cars was passed fairly well by the Eames, although their success was not particularly brilliant, whether from lack of practice or otherwise. The Westinghouse tests with 50 loaded cars were begun, and the first run reached of the American train with 20 cars at the rear cut out. The result was very satisfactory as respects motion, and when the heavy load of 1,000 tons of dead weight is considered, certainly not what can be called bad as respects distance. The figures are given below.

Since the emergency stops were abandoned it has been customary to allow the engineer to shut off before reaching the stopping post, at a stake 500 ft. away, and allow the train to close up somewhat. It is doubtful if this has any great effect to modify the violence of the shock, but it has the further advantage of simplifying the determination of speed from the dynamometer records, since the effort to make the speed just right by varying the throttle or reverse-lever is not continued up to the very instant of the stop. The routine of making the observations is as follows:

Three technical assistants ride on the engine. Mr. R. W. Bayley, of the Pittsburgh, Cincinnati & St. Louis, keeps an eye out on the working of the engine and gives the signals with a whistle. The regular order for each stop, followed whether there is a pusher on or not, is: three rings of the telephone to cut off pusher, answered by two that the pusher is cut off; one preparatory ring, which now means to shut off steam, 500 ft., before the stop, and one directly at the stop, all of which signals are transmitted by the telephone bells to the rear and middle cars. At the same instant a button is pressed which moves a pen on the dynamometer record in the first car. As these signals are not transmitted by the man who first gives them, they correspond almost precisely with the shutting off of steam on the dynamometer diagrams. Otherwise a discrepancy of fully half a second might be expected. Continuous records of the boiler, reservoir and train-pipe pressures and of the not very reliable speed indicator are kept on the engine. Mr. F. W. Sargent, of the Burlington, and Sam. Porcher, of the Pennsylvania, are the other observers on the engine.

Mr. P. Wallis, Engineer of Tests of the Burlington, and F. M. Herr, assistant, keep the dynamometer record, the car following behind the tender. A dynamometer record is a new feature in brake tests, and will have very great value, both to indicate when and how the brakes do their work and to enable the work done by the engine and train brakes to be accurately subdivided.

In this car likewise Mr. Joel West, Division Master Mechanic, with Messrs. Henderson or Hall of the Pennsylvania, make the measurements after each stop by means of the stakes placed 50 ft. apart along the line. The tape being fastened along the car from zero at the engine cab window, the measurements can be made almost instantly.

The work in the middle car is under the charge of Mr. Wm. Forsyth, Mechanical Engineer of the Burlington line. The apparatus here on use is that designed originally for the use of the American Brake Co. The interesting features are, first, an apparatus which gives a continuous diagram of the tension on the brake rods during each stop, which is a very valuable addition to the records, and a speed diagram taken on a Boyer speed indicator, which is not entirely reliable absolutely, but gives very correctly the changes of velocity. There is also a distance indicator, which is correct within a small percentage, but not used.

In the rear car Mr. Raphael Ryan, chief draftsman of the Burlington, who is neither an Italian nor an Irishman, as might be imagined from his name, but a Norwegian, has distinguished himself by the indomitable coolness with which he has continued to take a great variety of records in spite of outrageous ill-usage by the brakes. All changes of pressure in the brake-pipe, reservoirs and brake-cylinders or diaphragms are noted, with the time in seconds from the application to brakes on the rear car, stop, brakes off and under way. He is provided with cushions in front and rear, against which he presses his knees and back so that his feet do not touch the floor of the car, and is credibly alleged to be black and blue over sundry large areas. An assistant records his readings as they are called off. In this car also is the "slidometer," elsewhere described. Last and by no means least, Mr. Godfrey W. Rhodes, Chairman of the committee and the moving spirit of the whole affair, is circulating over and under and on either side of the cars most of the time, except when the stops are coming, when he can invariably be counted on to turn up in the rear car.

A special dispatch from Burlington, July 28, says: "The chief result of the past three days is the action of the American 50-car mixed train dropping down grade at 15 miles per hour. There was a constant undulating action of the brakes, causing 28 severe shocks, averaging 14 in. by impact gauge, the maximum being 62 in. in less than 1½ miles. When the train broke in two at two points there was a fair motion in the front half, but the ends were knocked out of nine new and strong cars at the rear end by the car-wheel lading, and there was some breakage in the caboose. The claim is advanced that cutting out the 20 rear cars would cure this action, I asked for, this will be tried. The engine brakes were not set at all on this test, except for a short distance at the top, but the undulating motion of the train kept the brakes set in various parts of the train automatically. As a whole these results tend to show that any kind of buffer brake of the types here represented will have considerable difficulty in regulating the speed of a long train down a long grade, although the American has made some good stops even with 50 cars.

"Otherwise the tests have been of service. The stops with heavy trains and on breaking trains in two of the Westinghouse and the Eames brakes were satisfactory. The work now is in the main developing nothing specially important. The tests end on Saturday."

Record of the Burlington Brake Tests.

On Saturday, July 17, the Eames brake was tested with 49 empty cars, or 51 cars including the dynamometer car, autograph register car (counted in train), and the caboose. The test was not absolutely perfect, as a car was disabled at Stop No. 4, preventing accurate time being taken for that one stop.

The record was as follows:

	Speed at time brakes applied.	Feet run after applying brakes.	Time making stop after brakes applied. Seconds.	Time of release of brakes after train stopped.
Stop No. 1	20	414	18	21½
" " 2	38	1,055	29¾	27¼
" " 3	22½	497	20	27
" " 4	30	1,442	25½*	28½*

* Estimated.

Upon returning to West Burlington two cars were switched out of the train and one switched in, leaving 48 cars beside the dynamometer and caboose car for the next test. The result of the second test was as shown below:

	Speed at time brakes applied.	Feet run after applying brakes.	Time making stop after brakes applie . Seconds.	Time of release of the brakes after train stopped. Seconds.
Stop No. 1	22	437	19	28
" " 2	38	1,016	28¼	31¾
" " 3	22	448	18	35¼
" " 4	40	1,399	35¼	28¾

On Monday, July 19, the Westinghouse brake was tested for an emergency stop with a train of 50 empty cars, exclu-

sive of dynamometer car next engine without brake and caboose at end of train The result was:

FIRST TEST.

	Speed.	Feet.	Time.	Release.
Stop 1	20½	354	16	59
" 2	40½	927	22¼	....
" 3	23	431	17½	37
" 4	43	1,104	....	....

SECOND TEST.

Stop 1	23	424	17½	35¼
" 2	40	922	22½	....
" 3	23	427	17¼	30¼
" 4	43	1,116	24½	....

The third test was upon similar terms, except that an easy, rather than an emergency stop was required. The result was:

	Speed.	Feet.	Time.	Release.
Stop No. 1	22½	1,041	48½	40¾
" " 2	40	2,524	59¼	32½
" " 3	22½	2,077	76½	16
" " 4	39	2,059	46¾	21¼

The two tests of the morning caused a tremendous shaking up in the caboose, as was to be expected, but test No. 3 brought the train to a stop with the ease of a first-class passenger train.

The Widdifield & Button brake was then tested with 25 cars (Lehigh Valley), 13 mixed and 12 empty, with the dynamometer car and the caboose added.

In order to avoid the severe jolting of the train, the brake was removed from the seven rear cars ere reaching stop No. 3, and from 10 rear cars ere passing stop No. 4. The result was:

	Speed.	Feet.	Time.	Release.
Stop 1	22	681	41	14¾
" 2	40	2,150	73	16¼
" 3	22	1,270	71	11¾
" 4	42½	4,033	109½	....

The No. 4 stop was rendered very unsatisfactory owing to the breaking of a centre-pin, causing delay in making stop.

On Tuesday, July 20, the first test was for 25 cars, 13 loaded and 12 empty, interspersed at irregular intervals in train, the autograph recording car in centre, with dynamometer car and caboose in addition to the number. This was a hand-brake test; two conductors and two brakemen, in addition to engine and tender, furnishing the resisting power. The result of the trial was:

TEST NO. 1.

	Speed.	Feet.	Time.	Release.
Stop 1	18½	774	43	25
" 2	35½	2,267	72½	59¾
" 3	22½	1,392	63	21
" 4	38½	4,063	104	....

The next test was a "gravity" test, in order to determine the friction of the train. The engine was to run at twenty miles per hour in passing stop No. 1. Steam was then to be shut off, and the train allowed to run without applied resistance until at No. 3 speed must be reduced to five miles per hour when steam would be shut off, and the train allowed to run by gravity down the grade until stop No. 4 was reached, when brakes were to be applied. The result was as follows:

TEST NO. 2.

	Speed.	Feet.	Time.
Stop No. 1	19½	*1,265 212	4:09½
" " 2	Engine working steam.		
" " 3		Time to stop 4, 2:57	
" " 4	31½	2,952	90

*West of mile post.

The hand brakes were applied at stop No. 4.

In the next test the same train was used, but the driver brakes were to be applied. The result was:

TEST NO. 3.

	Speed.	Feet.	Time.	Release.
Stop No. 1	22½	547	25¼	10
" " 2	39½	1,718	51½	12¼
" " 3	23	725	37	13¾
" " 4	41½	3,040	82½	10¾

The American Co.'s engine and tender (Wabash No. 1063) was then tried with dynamometer car.

TEST NO. 4.

	Speed.	Feet.	Time.	Release.
Stop No. 1	20½	260	12¼	....
" " 2	40½	889	....	....
" " 3	20	253	13¼	....
" " 4	38	925	26½	....

Following this test, arrangements were made for trial of 25 cars on the same terms as noted for Test No. 1. The result was:

TEST NO. 5.

	Speed.	Feet.	Time.	Release.
Stop 1	21½	476	22½	10¾
" 2	39½	1,487	44½	12¼
" 3	22½	628	30¼	15
" 4	40	2,763	75	13¼

The remaining test was under same conditions as the last one made. The result was:

TEST NO. 6.

	Speed.	Feet.	Time.	Release.
Stop 1	22½	606	28½	10
" 2	39½	1,643	50½	11¼
" 3	21	548	29	9½
" 4	40	2,774	75	18

The tests on July 21 were as follows:

Widdifield & Button, emergency stop, 25 cars mixed train, half empty, and half loaded. The results were:

TEST NO. 1.

	Speed.	Feet.	Time.	Release.
Stop No. 1	22	578	28	13
" 2	39½	1,858	56¾	14¾
" 3	21	800	39½	12½
" 4	42½	3,565	94½	...

TEST NO. 2.

	Speed.	Feet.	Time.	Release.
Stop No. 1	22½	625	30	11½
" 2	40	1,892	56	12¼
" 3	24	913	40	13½
" 4	41	3,730	99½	...

The American Brake was then tried, emergency stop, train of 50 empty cars. The result was:

TEST NO. 3.

	Speed.	Feet.	Time.	Release.
Stop 1	27	424	25	....
" 2	...	....	...	....
" 3	20½	445	24½	26½
" 4	34½	1,901	65	18

At 500 ft. west of stop No. 3 the engine shut off steam, and also at 1,000 ft. west of stop No. 4. The brakes were not applied until stops were reached, except so far as the reduced momentum of the train tended to apply them. At stop No. 1 a drawpin, two pins and a link were broken, therefore no stop was made at No. 2 and several cars were set out at West Burlington for repairs, seven having broken brake beams.

The remaining 43 cars were then tried, service stop, the brakes on one end of nine cars at each end of the train having been previously cut out. The result was as follows:

TEST NO. 4.

	Speed.	Feet.	Time.	Release.
Stop No. 1	23	771	37½	28
" " 2	35	1,518	51¼	....
" " 3	23½	1,019	47	16¼
" " 4	41	2,919	82	40¾

On Thursday, July 22, the following tests were made:

Westinghouse Brake, 50 cars mixed, loaded and empty, 75 per cent. of empty cars to be in front of train; service stops to be made.

The dynamometer car and caboose car were used in addition to train. The results are tabulated below:

TEST NO. 1.

	Speed.	Feet.	Time. Seconds.	Release. Seconds.	Impact gauge.*
Stop No. 1	20½	608	26	....	5 5 16 inch.
" " 2	39½	1,592	..	....	2¼ "
" " 3	22½	772	....	....	⅜ "
" " 4	41	1,787	...	...	15-16 "

TEST NO. 2.

Stop No. 1	20	739	32½	23	2½ "
" " 2	40	1,522	36	32¼	1-16 "
" " 3	22	655	26	8½	1-32 "
" " 4	43	1,811	41¼	....	⅝ "

TEST NO. 3.

Stop No. 1	20¼	636	26	13	3½ "
" " 2	†39	1,329	..	....	1-32 "
" " 3	†20	600	25	....	1½ "
" " 4	†41½	1,823	40½	....	½ "

* See illustrated descriptive article in this issue.
† Estimated.

The last column gives the movement of the iron disc used in the impact gauge.

During the first test two cars had some damage done to the draw-bar and were switched out, leaving but 48 cars for the second test. Neither time nor release were noted except as shown, there being some delay in signals. The speed noted "estimated" in test No. 3 was speed shown by the recorder upon the engine.

There were 49 cars for test No. 3. Just after stop No. 1 in the test, the worm gearing on the axle of the dynamometer car broke.

On Friday, July 23, according to programme, the American Co., with 50 empty cars, started on Test No. 1, but just previous to reaching Stop No. 1, the train broke in two and several drawbars and centre pins were broken, requiring the abandonment of the participation of the American brake for the day. The Eames Vacuum brake was consequently tested with a train of 50 mixed cars, loaded and empty, including the recording car, and having in addition the dynamometer and caboose cars. The result was as follows:

Test No. 2.

	Speed.	Feet.	Time.	Impact gauge.
Stop 1	21	905	38	1 1 11-16 in
" 2	*35	1,677	47½	1 1-16 " 1 1 15-16 " 1 5-16 "
" 3	22½	1,097	43¼	1 1-64 " 1 7 11-16 " 1 3-16 "
" 4	41	3,665	91	1 3-32 "

* Engine record.

No attention was paid to the release, the stops being service stops, to avoid severe concussion. It will be noticed that the impact gauge recorded several distinct movements. None of them were, however, very severe.

Further tests of the Eames brake were then made, the equipment being the same as for No. 1, except that in the Test No. 4 only 48 cars were used in consequence of breakage of draw-bars, requiring the setting out of two cars.

TEST NO. 3.

	Speed.	Feet.	Time.	Impact gauge.
Stop No. 1	20	710	31¼	1 1-16 inch.
" " 2	..	..	...	1 Back. 5-16 "
" " 3	22½	994	40	1 8½ " 1 4¾ "
" " 4	41	2,505	64	1 3½ "

TEST. NO. 4.

	Speed.	Feet.	Time.	Impact gauge.
Stop 1	12	826	32½	1 none.
" 2	36	1,010	46¼	1 7½ inch.
" 3	22½	976	39½	1 9⅝ "
" 4	40	2,757	73	1 ¾ "

In test No. 3 the train was making speed of about 35 miles per hour, when a coupling pin broke within six cars of the rear of train, and yet there was no shock to move the disc in the line trough arranged in the caboose.

In test No. 4 the train was pulled apart seven cars from the front without making shock in caboose car. This tested the efficiency of the Eames brake for such emergencies.

On Saturday, July 24, the Eames brake made the first trial with a mixed train of 50 cars, half loaded and half empty. The object of the first test was to ascertain the controlling power of the brake down a long grade. The requirement was to start on the level and make speed up to 20 miles per hour, then decrease speed to 15 miles per hour and maintain at that down the grade. This would exhibit the control the engineer can exert over the train, as the speed would be about 70 miles per hour if no control was exerted after attaining the 20 miles per hour. The fifteen miles was smoothly maintained.

While returning to West Burlington the train broke in two, and two truss rods beneath the tender were broken, thus forcing postponement of the further tests assigned the Eames Co. for the day. The Westinghouse Brake Co. then madd three tests under the rules, their equipment being 50 loadee cars and Engine No. 110 and tender. Practically, there were 49 loaded cars, the autographic recording car being in the centre. The dynamometer car, next to the tender, and the way car, in the rear of the train, are treated as additional cars. The results shown were as follows:

TEST NO. 1—SERVICE STOPS.

	Speed	Distance.	Time.	Impact gauge.
Stop No. 1	22½	709	29¼	1 11 in.
" " 2	38	1,455	38½	1 5-16 "
" " 3	23¼	834	31¼	1 1-64 " 1 1⅛ "
" " 4	39½	1,959	47	1 9⅛ "

TEST NO. 2.

Stop No. 1	20½	1,302	48		None.
" " 2	36½	1,396	37½	1	¼ in.
" " 3	24¼	915	33¾	1	11 7-16 "
" " 4	36½	2,065	50	1	15 5-16 "

TEST NO. 3.

Stop No. 1	19	729	33¼	1	1-64 in.
" " 2	30½	1,255	38¼		None.
" " 3	23	871	32½	1	¼ in
" " 4	35	2,092	51	1	1 7-16 "

This closed the tests for the day.

Among the visitors were Mr. Sleppey, Master Car-Builder St. Joseph and Western; Col. A. W. Soper, of New York, formerly Superintendent St. Louis, Iron Mountain & Southern; W. H. Bartlett, Master Mechanic Chicago, Burlington & Kansas City; H. D. Judson, Superintendent and B. W. Morris, Master Mechanic of Chicago & Iowa; A. J. Paradise, Master Mechanic Hannibal & St. Joseph; W. E. Hall, Pennsylvania; G. W. Bender, Superintendent Indianapolis, Decatur & Springfield; B. K. Verbryck, Master Car-Builder, T. S. Couch, C. M. Donard and J. P. Evans, Chicago, Rock Island & Pacific; Wm. P. Shinn, of New York; D. Hawksworth, Master Mechanic Burlington & Missouri, in Nebraska, and many others, including the following officers of the Chicago, Burlington & Quincy: Mr. T. J. Potter, First Vice-President; H. B. Stone, General Manager; W. F. Merrill, Superintendent of the Iowa Division; R. D. Smith; L. E. Johnson; R. W. Colville; H. F. Dodd; E. Jones; J. M. Springer; W. S. Darrow; E. N. Benedict, Master Car-Builder; Fred Geyer, H. D. Steadman, and E. Forsythe.

Among brake representatives present were Messrs. W. W. Card, of Pittsburgh, Pa., secretary of Westinghouse Brake Co., and F. W. Fredericks, South American representative of the Westinghouse Brake Co.

Impact Gauge, Burlington Brake Tests.

As part of our record of the Burlington brake tests, and possibly not the least important and useful part of their minor results, we present the impact gauge, or "slidometer," as it was christened, for measuring the violence of the concussion from the application of power brakes on long trains. Simple as the device appears, it has answered its purpose perfectly—much better, in fact, experience indicates, than the more elaborate devices which might have been adopted, could the importance of some gauge of the kind have been foreseen long enough in advance to have prepared them.

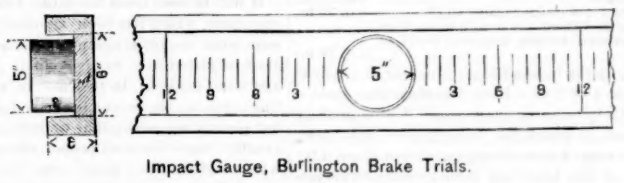
The device consists simply of a wooden trough made of good clear American white pine of fairly straight grain and run over after machine planing with a smoothing plane, but not sandpapered. This trough, as constructed and now in use, is 14 ft. long and screwed fast to the centre of an eight-wheel way car or caboose at the rear of the train. No brakes are applied to this car, which weighs 24,610 lbs. Were brakes applied to its wheels it would probably reduce the motion of the weight from a given application of brakes slightly. Were the car lighter the motion might possibly be somewhat less.

In this trough slides an iron weight 5 in. in diameter and 3 in. high, weighing 16½ lbs. The weight was cut from the end of an axle and turned off in the lathe with a light finishing cut, without filing or other finishing, except to round off the corners with a file to a radius of about $\frac{1}{32}$ in. The trough is cleaned out with a handkerchief after each test and protected by a box cover when not in use, but otherwise nothing is done to the surfaces of either the weight or trough. Should any tendency to polishing appear, the trough will be planed out again with a smoothing plane and re-graduated, but so far no appreciable change of surface has resulted, the wear being very slight and the surface originally smooth.

The advantage of the device as an "impactometer" are that no ordinary surge or slight shock, such as would pass without notice in a passenger train, will move it at all. The irregularities incident to the use of a fluid, such as mercury or water, are therefore absent. This was illustrated by the behavior of a water-tank gauge improvised, like that illustrated, on the spur of the moment. Though probably as reliable as the glass of water often used for such a purpose, it was found that the oscillations caused by the ordinary movement of a train would throw the water higher than the impacts it was desired to gauge.

The proportions first adopted for the gauge chanced to be just about right, and as quite a body of records will probably be accumulated before the tests are completed as to the behavior of the gauge under various conditions, its very simplicity gives it a certain value as one which can be reproduced at any time and in any locality for any other tests, or—what is perhaps more important—for use in drilling men, or testing their skill, in the handling of long freight trains provided with power brakes. Experience at Burlington has already abundantly proved that the only serious difficulty to be apprehended in the handling of freight trains of 50 cars, and probably much longer, by either air or vacuum brakes, is the liability to violent shocks in the rear third of the train, of which those who may be in the front third will be entirely unconscious. In stating this we neglect, of course, one other difficulty which must always be considered, that of keeping the power brakes on so many cars in good order, but as to that we have as yet no light from the tests, nor shall we have until after the "endurance tests" of 1887, when the efficiency of the brakes after eight months' use without readjustment or more than ordinary repairs will be determined.

It will therefore be out of the question to use power brakes on very long trains without taking some special pains to train men in handling them so as to make quick working stops without shock at the rear, and the gauge illustrated may possibly serve a useful purpose for this end. With such training, experience indicates that 50 car trains at 20 miles per hour, mixed loaded and empty cars, can be stopped on a level in about 500 ft., and at 40 miles per hour in about 1,400 ft., without moving the weight more than a fraction of an inch and without causing any shock which would seriously harm a "a sick lady in the caboose"—a visionary personage who caused some merriment at the brake tests. In



Impact Gauge, Burlington Brake Trials.

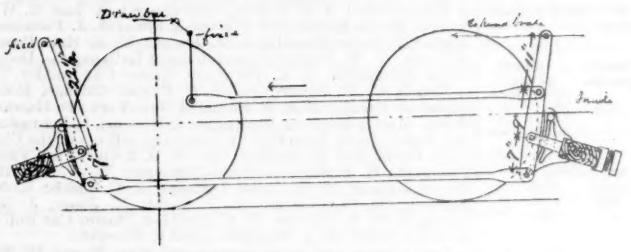


Fig. 1.—American Buffer Brake, St. Louis & San Francisco Cars.

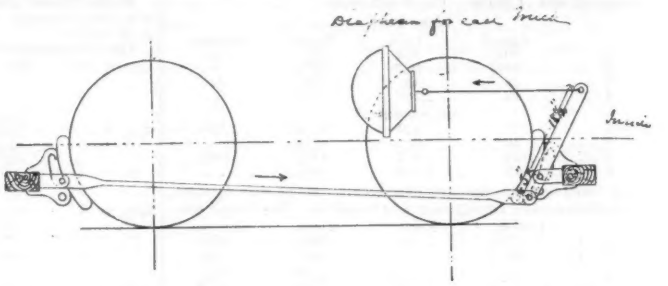


Fig. 2.—Eames Vacuum Brake, Indianapolis, Decatur & Springfield Cars.

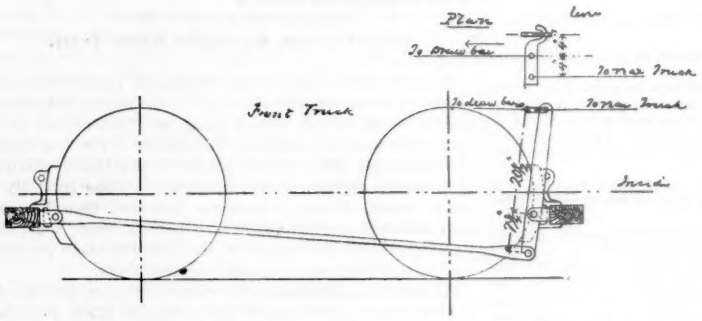
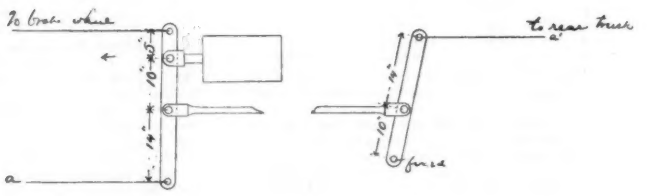


Fig. 3.—Rote Buffer Brake, Chicago, Rock Island & Pacific Cars.



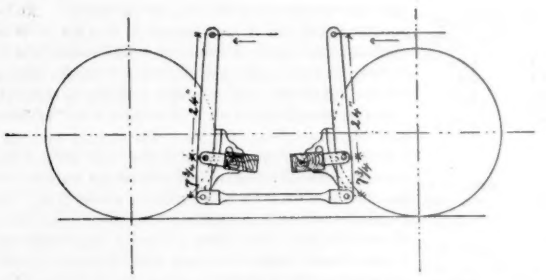


Fig. 5.—Widdifield & Button Friction Buffer Brake, Lehigh Valley Cars.

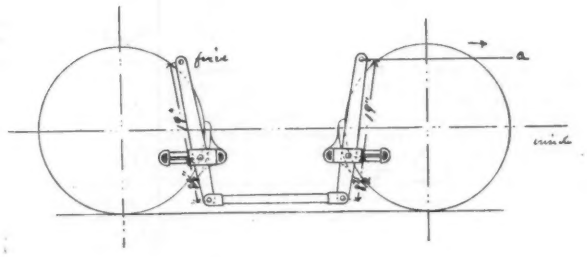


Fig. 4.—Westinghouse Automatic Air Brake, Chicago, Burlington & Quincy Cars.

THE BURLINGTON FREIGHT BRAKE TRIALS, DIAGRAMS OF FOUNDATION BRAKE GEAR.

fact, stops almost as good as this were made on the very first run in which the gauge was used, the successive movements of the block having been 5 7/16, 2 1/4, 3/4 and 1 1/8 in. on the four stops at 20 and 40 miles per hour alternately, and on the second run, 2 1/2, 1 1/16, 3/8 and 5/8 in. In the 50 car stops of the American brake, which, it will be seen in another column, behaved badly, the weight was slidden 16 1/4 in. and then back 20 1/2 in., when the train parted in three places, a little contingency which has happened on a smaller scale a number of times in the tests, as well as almost every other kind of breakage which freight brakes are subject to.

In a rude way, subject to correction when the full records are available, the behavior of the block may be taken as follows:

Skillful stops of 50 cars at any speed, with a sacrifice of about 1/8 in quickness of stop	0 to 1 in.
Fairly good stops, not objectionable to stock and not necessarily any quicker	4 to 6 in.
Stops objectionable and not dangerous to stock	8 to 10 in.
Violent stops, making it difficult for a man to hold on to the car when prepared for the stop and likely to injure stock	12 to 16 in.

Ordinary working jerks in handling trains through yards will throw the weight 1 or 2 in. Even less than that gives a jerk which is very likely to break draw-gear. Unfortunately the earlier brake tests in which the "emergency" stops were made (which paid no regard to anything but stopping quickly) without any record of this kind, but their excessive violence can be appreciated in the light of the above details when it is stated they would unquestionably have slidden the above weight 20 or 30 ft., since they slid a heavy tool box on the rough floor of the middle car nearly 12 ft. Such a stop, with an ordinary train of 50 cars, in which several cars would probably be weak and in bad order and the draw-gear of all sizes and patterns, would be almost certain to cause a wreck. When it is seen, as will probably fully appear before the tests are concluded, that the avoidance of all this shock means merely a fractionally greater distance and having the knack of handling the brakes on long trains, the possible utility of some such gauge as that described is evident. No ordinary hand-brake stop will slide the weight at all.

Foundation Brake Gear, Burlington Brake Tests.

Our records of the Burlington brake tests will necessarily extend over a number of issues and require more or less cross reference. One of the most important details which it will be necessary to bear in mind at all times, if the indications of the tests themselves are to be correctly interpreted in respect to comparative efficiency, is what is known in train-brake parlance as the "foundation brake-gear," being the parts used with hand brakes as well to which the power is applied. The goodness or badness of this will, of course, have an important effect on the record of efficiency, but it has absolutely no bearing on the merits of the power brakes themselves.

It might have been expected that in tests of such importance to the pockets of the competitors they would have all taken very good care to have the foundation brakes at least about the best of their kind, in order that their own special appliances might put their best foot forward, and hence that it would not be necessary to take particular account of any small differences, but the engravings above, figs. 1 to 5, and the table given herewith, show that this is by no means the case. On the contrary, three out of the five competitors have deliberately handicapped themselves with a loading of 10 1/2 to 14 per cent. against them, by appearing on the ground with brakes hung in the regretably common but unmechanical fashion shown in figs. 1, 2 and 3, in which it is necessary either to increase the pressure so as to slide the wheels on the axle nearest the brake-lever, or to give away about one-quarter of the proper pressure on the opposite brake-beam.

It will be seen from the table below that the latter is the expedient which has been resorted to, if we may make the somewhat doubtful assumption that the buffer brakes have been adjusted so as to give equal pressures from the buffer and hand brakes. In the case of the American brake only this is not so, the power brake-rod pull being unusually small, but plainly not so small as to reduce the brake pressure too greatly, since when all proper allowances are made, as elsewhere stated, it has made some very remarkably good stops, the difficulty with its apparatus arising from quite other causes than lack of power or brake-shoe pressure.

The tests have shown that with all the buffer brakes the pull on the brake-rod is a decidedly uncertain and variable quantity, the brakes throughout the train going on or off, in part or whole, several times during the stop, causing that violent irregularity of motion which compelled the withdrawal of the Widdifield & Button on the 25 car tests, and the American on the 50 car tests. They may, therefore, have thought it rather unimportant to go into niceties of equalizing pressure, even to the trifling extent of adding a few pounds of dead lever to the brake-gear. It was, of course, equally foolish in their case, but more readily comprehensible. With the Eames brake, however, which we were at first advised was the only one having unequalized brakes, the pressure is definite and positive, and the following table and notes show the great disadvantage caused by the want of an equalizing device.

We shall endeavor in our analysis of the brake tests to eliminate all these extraneous and irrelevant sources of error and show just what is the comparative efficiency of the power apparatus alone, assuming foundation brakes and other conditions equally favorable. This is plainly but just, and it is likewise essential to a correct understanding of the results.

Table showing proportions and comparative efficiency of the Foundation Brake-Gear of the five competitors at the Burlington Brake Tests, as shown in figs. 1 to 5.

Fig.	Brake Co.	Kind of brake.	Road owning cars.	Pressure on brake-beams per 1000 lbs pull on brake-rod.		Comparative efficiency.		Average efficiency per cent. of max.	Loss of efficiency per cent.	Approx. weight of cars.	Weight per axle empty.
				First axle.	Second axle.	First.	Second				
				Lbs.	Lbs.						
1	American	Direct buffer	St. L. & S. F.	2,286	1,686	100.	73.7	86.9	13.1	27,600	4,600
2	Eames	Automatic vacuum.	I., D. & S.	4,700	3,700	100.	78 7	89.4	10.6	21,000	3,500
3	Rote	Direct buffer	C., R. I. & P.	3,645	2 645	100.	72.3	86.1	13.9	24,000	4,000
4	Westinghouse	Automatic air	C., B. & Q.	3,235	3,235	100.	100.	100.	.....	24,100	4,016
5	Widdifield & Button	Friction buffer.	L. V.	3,097	3,097	100.	100.	100.	.....	21,000	3,500

The American brake cars were equalized for hand brakes, but not for power brakes, as will be seen from fig. 1. Tension of 1,000 lbs. on hand-brake rod throws a pressure of 3,286 lbs. on the brake beams. After the bad results of the first fifty car tests, the brake leverage was altered so as to bring the brake-beam 2 in. nearer the lower brake-rod, increasing the brake-beam pressure per 1,000 lbs. tension on draw-bar from 2,286 and 1,686 to 3,290 and 2,200. This had the effect of remedying the constant breakage of brake-beams, but rather increased than diminished the shock on the rear car.

The Westinghouse brake is provided with an 8 in. cylinder and for a working pressure of 50 lbs per sq. in., which is rarely exceeded, and throws a pressure of 5,807 lbs. on the brake-beams.

The Eames brake uses a diaphragm of 15 in. external diameter and 119 sq. in. effective area. The working vacuum of 15 to 20 in. gives a pull of only 893 to 1,130 lbs. on the brake-rod, or 4,195 to 5,593 lbs. on the first break-beam, and only 78.7 per cent. of that on the other brake-beam.

The New York Central Sleeping Car Company's Shops.

The Buffalo *Express* describes as follows the new shops which the New York Central Sleeping Car Co. is building at East Buffalo, the nucleus of these works being the shops which were built at that point for the West Shore road, but abandoned when that road was leased to the New York Central:

In April last the contracts for additions to the shops were

given out and the work has so far progressed that the shops are almost completed. The principal part of the plant consists of what may be termed the erecting shop. A semi-circular building, 502 ft. in circumference at the outer circle and 80 ft. wide, containing 20 stalls, was taken as the nucleus, a turn-table 100 ft. long giving access to each opening. To this has been added a building 503 ft. long and 104 ft. wide, with a transfer table, as it is called—a pit with a long car running on five rails, which traverses the entire front of the of the building—522 ft. long and 65 ft. wide. The motive power for this transfer table is furnished by an engine similar to those in use for pile-drivers. By its means cars may be transferred from one stall to another or to a track at the southern end, which will lead to the main line of the New York Central. One end of this erecting shop will be used as an upholstery room, and the adjoining part of it as a paint shop.

Directly in the rear of this shop is a building containing the truck, machine, and blacksmith shops. The truck shop will be 74 ft. wide and 98 ft. long, the machine shop 74 ft. wide and 80 ft. long, and the blacksmith shop 74 ft. wide and 114 ft. long, each being separated from the other by brick partitions.

Adjoining these shops and in the rear of the erecting shop is a building similar to that last described, which is to be used as a planing mill and cabinet shop, the former occupying the rear part of the building. This shop is 306 ft. long and 74 ft. wide, and is flanked on the northeast corner by the boiler-house and engine-room, which is 63 ft. long and 40 ft. wide. A chimney 80 ft. high, with a base 9 ft. square and a top 5 ft. square, flanks this building.

Near Broadway is the office, a two-story structure 40 ft. long and 22 ft. wide. The first story is divided into offices for the Superintendent, Assistant Superintendent and clerks, though the former may retain his office at the New York Central Depot. The second floor, which is one large room, is airy and well-lighted, and will be used entirely by the draftsmen of the company.

The buildings are wholly of brick, and were built by Mr. W. R. Haven; Mr. B. C. Dean looking after the carpenter work and painting, Messrs. G. H. Peters & Son the roofing, and the Niagara Bridge Co. the trusses for the roofs and the transfer table.

Now that the buildings themselves have been spoken of, it will be well to devote some description to the interiors. The planing-mill is being supplied with the latest patterns of wood-working machinery from the shop of Messrs. J. S. Fay & Co., Cincinnati, O., the machine shop likewise receiving machinery of the latest pattern from Messrs. Bement, Miles & Co., of Philadelphia. The motive power for the entire plant will for the present be supplied from a 200 H. P. Corliss engine, which will be fed by a steel boiler of 235 H. P. Both boiler and engine are now being put in, as well as the machinery in the planing-mill and machine shop. Large quantities of gravel are being drawn from Clarence and used to fill in the floor of the erecting shop and the yard, the levels of which are now about 4 ft. below the proper grade. It is expected that all this work will be finished, the tracks laid and the machinery in position by Sept. 1, although it will probably be Sept. 15 before work will be begun in earnest.

The land on which the shops have been built is 37½ acres in extent and is being thoroughly sewered. Connections are also being made with the water-mains on the Williamsville road, by which the shops will be supplied with water. A picket fence 9 ft. high and 5,064 ft., or nearly a mile, long is being built around the grounds, the entrance being at the Broadway side, where a handsome office will be built for the time-keeper. When the shops are ready for business 600 men will be at once employed, the number to be increased as fast as the business will warrant. The present shops on Seneca street at the New York Central Railroad crossing will be retained for a year or two at least, for the purpose of cleaning and revarnishing cars. The company now has about 400 cars in service, and the proper repair of these will, it is expected, keep the entire force busy. At times when repair work is slack the men will be put at work erecting new cars, and this, it is believed, will keep the company sufficiently supplied with new equipment. During the coming winter it is intended to overhaul every car in the company's service, so that when spring opens all will be in first-class dition.

It is not the intention of the company to rival Pullman as a model town. Land in the vicinity of the new shops is cheap and the workmen are to be encouraged by being given steady work, to seek to own their own homes. The progress of the new industry will be watched with interest by the citizens of Buffalo, especially so as the plans of the company contemplate doubling the capacity of the new shops within a very few years.

Iron and Steel Production in the First Half of 1886.

The *Bulletin* of the American Iron & Steel Association for July 28 publishes the statistics collected by the Association from iron and steel manufacturers for the half-year to June 30. The *Bulletin* sums up the results as below:

PIG IRON.

Our production of pig-iron in the first six months of 1886 amounted to 2,954,209 tons of 2,000 pounds, or 2,637,687 tons of 2,240 pounds. The country has never before produced as much pig iron in the same time. Prior to 1879 it never produced as much pig iron in a whole year as it did in the first six months of 1886, and the production of 1879 was only 116,666 net tons greater than that of the first half of this year. The production in the last three half-years was as follows, in both net and gross tons·

	Net tons.	Gross tons.
First half of 1885	2,150,816	1,920,371
Last half of 1885	2,379,053	2,124,154
First half of 1886	2,954,209	2,637,687

The greatest absolute gain in production in the first half of 1886 as compared with the last half of 1885 was made by Pennsylvania, as would naturally be expected, but among the states which are prominent in the production of pig iron the greatest relative gain was made by Ohio and Alabama, each of which greatly increased its production. New York, New Jersey, West Virginia, Tennessee, Illinois, Michigan and Wisconsin also show an increase, as do also the less important states of Maine, Massachusetts, Maryland, Indiana and California, but Virginia, Kentucky, Missouri and Georgia show a decrease.

Perhaps the most noticeable increase in the first half of 1886 was that made by the Lehigh Valley. For some time this district has been second to Allegheny County, but in the first half of this year it shot ahead of its active competitor, making 320,568 net tons, against 301,014 tons by Allegheny County. Each of these Pennsylvania districts, by the way, makes more pig iron than any state in the Union except Ohio.

Of the total production in the first half of the present year 1,745,561 net tons were made with bituminous coal and coke, 1,011,757 tons with anthracite coal and mixed anthracite and coke, and 196,891 tons with charcoal. As compared with the last half of 1885, the production was as follows, in net tons:

	Six mos., 1885.	Six mos., 1886
Bituminous coal and coke	1,414,327	1,745,561
Anthracite and coke	751,173	1,011,757
Charcoal	213,553	196,891

It will be seen that the remarkable increase in production in the first six months of the present year was wholly in pig iron made with mineral fuel, that made with charcoal showing a decrease.

The production of pig iron with anthracite coal unmixed with coke is rapidly declining. In the first half of the present year only 202,556 net tons were made with anthracite alone, while 809,201 tons were made with mixed anthracite and coke.

Included in the aggregate production of pig iron in the first half of the present year were 22,446 net tons of spiegeleisen. This indicates a total production for the year of about 50,000 tons.

The stocks of pig iron on hand and unsold in the hands of makers or their agents at the close of the first half of 1886 amounted to 470,421 net tons, which was a slight increase on the quantity held in stock at the beginning of the year, namely, 416,512 tons. At the close of each of the last four half-years the stocks of unsold pig iron were as follows, in net tons: Dec. 31, 1884, 593,000 tons; June 30, 1885, 692,916 tons; Dec. 31, 1885, 416,512 tons; June 30, 1886, 470,421 tons.

This country will make more pig iron in 1886 than in any previous year in our history.

STEEL AND STEEL RAILS.

Our production of Bessemer steel ingots in the first half of 1886 amounted to 1,073,663 net tons, against 938,418 tons in the second half of 1885, and 763,344 tons in the first half of 1885. These figures include our production of Clapp-Griffiths ingots in the periods mentioned—24,810 net tons in the first half of 1886, 17,247 tons in the second half of 1885, and 4,409 tons in the first half of 1885. In no six months in our history have we ever before made as large a quantity of Bessemer steel as in the first half of 1886.

Our production of open-hearth steel ingots in the first half of 1886 amounted to 92,540 net tons, against 80,543 tons in the second half of 1885, and 68,838 tons in the first half of 1885.

Our production of Bessemer steel rails in the first half of the present year amounted to 707,447 net tons, against 622,161 tons in the second half of 1885, and 452,446 tons in the first half of 1885. Large as was our production of Bessemer steel rails in the first half of 1886 it was exceeded in one of the half-years of 1882, if not in both. We did not compile half-yearly statistics in 1882. In that year we made 1,438,155 net tons of Bessemer steel rails, the one-half of which quantity is greater than our large production of 707,447 tons in the first half of 1886.

Our production of open-hearth steel rails in the first half of 1886 was only nominal, amounting to 852 net tons.

This country will make more Bessemer steel, more Bessemer steel rails, and more open-hearth steel in 1886 than in any previous year.

A French Study of American Locomotive Service.

In September and October of last year, Mr. D. Banderali, Engineer of Motive Power of the Northern Railroad of France, and Mr. Maurice Luyt, a French mining engineer, visited this country and made a study of the locomotive service on our railroads, and in the May number of the *Revue générale des chemins de fer*, Mr. Banderali gives an account of his observations in an article entitled "Some Peculiarities of Locomotive Service on the Railroads of the United States."

He begins by saying that he was struck by the fact that the number of locomotives of the different railroads was small in proportion to the mileage of road and the train mileage; and also by the fact that so small a part of the engines were undergoing repairs in the shops; also by the smallness of the stocks of materials used for repairs.

Mr. Banderali divides the railroads which he studied into two classes—those east and those west of the Mississippi. The density of traffic on the former, he says, can be compared with that of the principal lines of Central Europe and of France, while the Western lines have a much thinner traffic and cannot so fairly be compared with the European railroads. To illustrate, he gives a table showing the length of road worked, whole number of locomotives and number per 100 kilometres of road, total locomotive mileage, locomotive mileage per mile of road (which he calls the "co-efficient of activity"), and average mileage per locomotive of eight Eastern roads, including the trunk lines and the Reading, and nine Western roads.

The four trunk lines, the Reading and the Boston & Albany he found to have from 46 to 66 locomotives per 100 miles of railroad; the other lines, from 13 to 26. The annual average mileage per locomotive on the Eastern roads above was 21,974 to 37,439. The daily mileage made by enginemen seemed to him large: 110 to 130 on passenger trains and 90 to 110 on freights.

On some lines the enginemen run 200 miles per day for four days in the week. He found the men active and robust, and the service arranged to be comfortable for them, the cabs giving good shelter, provided with cushioned seats, and the engines generally well equalized and on good springs. "On most of the Eastern lines, where the speed is considerable, the track is well maintained, well ballasted, very solid and firm; the curves are very carefully laid out, and all the rails on short curves bent before laying, so that shocks and jars and consequently the fatigue of the enginemen are reduced to a minimum. The enginemen deliver their engines to the round-house men as soon as they arrive, and report at once to the office, and are then absolutely free until the next trip. They are usually not paid by the day or by the month, but by the trip. The enginemen easily (?) make $120 to $160 per month."

The repairs of the locomotive are reduced by the solidity and simplicity of their construction. Each company has four different principal types, one with two axles coupled for passenger trains, one with three axles connected for light freight trains, one with four axles connected for heavy freight trains, and one for switching. These types do not differ greatly on different roads, and a great many parts are common to all the types, considerably reducing the number of spare pieces to be kept in stock; and when the locomotives are built by manufacturers, spare parts can be ordered of them at very moderate prices.

Passenger trains are relatively light, but the loads of freight trains are pushed to the last extremity, calculating with a very favorable co-efficient of adhesion, which the general dryness of the climate favors. As a maximum, traction is equal to one-fourth of the adhesive weight, while in Europe one-seventh is taken as an average.

The resistance at a speed of 15 miles an hour is from 6 to 8 lbs. per ton hauled, and the Americans claim that is reduced by their system of cars mounted on trucks.

It is common to meet freight trains of 40 cars weighing about 900 tons gross, hauled by eight-wheeled connected engines with 16 by 24 in. cylinders, on the New York Central Railroad, which has short grades of 42 ft. per mile. On lines where the traffic follows down the grades, coal trains sometimes have more than 100 cars. There are many brakes, with one man to six or eight brakes, which they put on successively, running over the roof from one car to another. "Truly a barbaric practice!"

The rule on most European roads is that the loads going down grades shall be no longer than those which can be taken up. "This rule is not comprehended in America, and in fact it is not rational, if a sufficient number of brakes can be depended upon, or if continuous brakes are used, which they are beginning to apply to freight cars on a great scale in America."

The author compares a Baldwin Consolidation engine with an 8-wheel engine of the French Northern Railroad, as follows:

	French Northern.	Baldwin.
Cylinders, diameter	500 mm.	508 mm. = 20 in.
" stroke	650 "	610 " = 24 in.
Diameter of driving-wheels	1,300 "	1,270 " = 50 in.
Weight on drivers	44 tonnes.	44 tonnes = 48½ tons.
Total weight	44 "	51 " = 56 tons.
Tractive power per kilog.:		
Pressure in boiler	1,250 kg.	1,240 kg.
Load hauled (theoretical):		
Grades of 26.4 ft. per mile	840 tonnes.	1,130 tonnes.
" 52.8 " "	460 "	670 "
" 79.2 " "	305 "	465 "

It would appear from this that American engines have to develop greater power per mile run than French engines. But to compare performances, we should know the weight hauled, the speed and the profile of the road, as well as the distance run. Several American engineers estimate the effort of the locomotive by the gross ton-miles. This is better than engine mileage, but it is not enough. The life of a locomotive on the Eastern American railroads is 15 to 20 years. The locomotive expenses per engine mile in America and France, Mr. Banderali thinks, it would not be profitable to compare, the differences in wages and cost of fuel are so great. He quotes the cost on several American roads, however.

The American companies which favor having a locomotive always run by the same engineman and fireman, Mr. Banderali says, do not hesitate to violate their own rule whenever traffic presses and they are not able or do not wish to get more engines. He gives the following as generally having two crews to one engine: The New York Central, the Cincinnati, New Orleans & Texas Pacific, the Boston & Albany, the Chicago, Burlington & Quincy; the Pennsylvania is having a very varied practice, in which the "first in, first out" system is particularly noticed.

Exceptional cases of locomotive service are mentioned, as follows: On the New York Central, 415,790 miles, with passenger trains in five years, by No. 100, an average of 278 per day, costing 2.17 cents per mile for maintenance, and two similar cases. On the Pennsylvania Railroad No. 1,047 hauled passenger trains between Altoona and Pittsburgh, 14,100 miles, in July, 1885, and 14,200 miles in August, or an average of 457 miles per day for the two months. This was done with two crews. The first left Pittsburgh at 7 a. m., and reached Altoona at 10.45 a. m.; left Altoona at 3.40 p. m. and reached Pittsburgh at 8.15 p. m.; when the second crew took it cut at 9.10 p. m., reaching Altoona at 1 a. m., and started back at 2.30 a. m., reaching Pittsburgh at 6.15 a. m.

In the year 1884, the largest passenger mileage made by one locomotive between Philadelphia and Pittsburgh was 82,500 miles, by No. 95, and the largest freight mileage 48,800, by No. 975; the average passenger mileage of all engines being about 33,500, and the average freight mileage 25,200.

Mr. Banderali concludes as follows:

"In the preceding statement of facts I have abstained from expressing any personal opinion on the comparative value of the different systems of using enginemen in locomotive service; evidently in a matter of this kind nothing is absolute. But one remarkable fact prevails: everywhere, and whatever the system adopted, I found the engines in a perfect state of repair, and the motive power service as satisfactory as possible.

"In conversation with the vice-presidents, general managers and engineers of the different companies which practice the system of more than one crew for one locomotive, I have found them all positive in the opinion that the system is advantageous, even from the point of view of the yearly expenditure for repairs. Mr. Thomson, of the Pennsylvania Railroad, and Mr. Buchanan, of the New York Central, told me that their own statistics proved that a great reduction of cost of repairs per mile run had followed the change from the old system to the new. I hardly dare say, fearing I may have misunderstood, that Mr. Buchanan calculated that the cost per mile had fallen from 6 to 3 cents, that is, had been reduced one half.

"It has not been without difficulty, however, that American engineers have succeeded in modifying the established customs. Their personal intervention, unceasing, energetic, patient, persistent, and at the same time adroit, has overcome all opposition.

"As I have already said, they did not make the system general from the first and without regard to circumstances. They applied it first where they thought it would have the best effect, profiting sometimes by a pressure of traffic, in which cases all engineers agree in adopting the system. Only gradually was it applied to the whole of a division or a system. They took care to interest the men in the success of their experiment; they associated together in the working of the same engine men of good character who were on good terms with each other; and in some cases it was often only after several months' experiment, quietly conducted, that they succeeded in realizing their plans and obtaining the satisfactory economical results which I have ascertained.

"I cannot give here an abstract even of the tables of locomotive performances which I have consulted; the work of translation and classification would be too great. Something of this kind cost Lavoinne and Pontzen three years' labor. Their work on the railroads of the United States is a model of scrupulous accuracy and impartiality. The more I read this book, the more do I respect the merit of its authors, after whom I think there is not much to say on a subject which they almost exhausted at once. However, experience with the methods which they commended five years ago is now riper than when they were in America, and this extended experience, the practical results of which I collected on the spot, has only confirmed the hopes which were but beginning to be cherished at the time when these engineers brought them to our attention."

Frigid.

The lady who runs the model restaurant at Exeter, N. H., on the Boston & Maine, has recently adopted a new idea, which is thoroughly enjoyed by passengers. The instant trains stop there a neat waiter enters the cars with tempting glasses of ice cream, the entire little outfit of glass, saucer and spoon being sold for 20 cents. A good many customers catch on to the cooling lunch.—*Boston Herald.*

RAILROAD GAZETTE

Published Every Friday.

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Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

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SOME RESULTS OF THE BRAKE TESTS.

It is natural, if hardly profitable, to attempt to draw certain conclusions from a long-drawn-out series of tests like those at Burlington before they are finally completed, and before it is quite certain that an entire change of the situation may not occur before they are concluded. While this is not wise, as a rule, some things appear to have been made so clear already that no reasonably possible chance exists of any need for reversal of judgment.

Among these perhaps the most important is as respects the behavior of long trains with slack when braked with a power brake. At the time we went to press last week the indication was strong that the use of power brakes of any kind on long slack-coupled trains was going to result in a constant danger of terrific shocks at the rear whenever anything like a quick stop was attempted. While no serious difficulty in this respect arose with any of the leading brakes with 25-car trains, the shocks were far more than quadrupled by doubling the train, when the brakes were forcibly applied.

This was a fact which would certainly and properly have been made much of by those who favor tight couplings, and perhaps with good results in the end. The tests of last week have shown that it would not have been justified, however, since they have made it tolerably clear that the sacrifice of a very moderate percentage in quickness of stops—possibly not even so much as 10 per cent.—will enable 50 or 75-car trains with slack couplings to be handled with quite sufficient ease and gentleness by men properly trained in the handling of the brake. Some of the tests made, as recorded in another column, show that without any difference whatever in the length of the stop the shocks in the rear car may differ as much as 1 to 10 or 15, even where the train is handled by the same man and, so far as he can judge, with equal care. The important part which thorough training in the handling of continuous brakes will play in their application to long trains is evident from such facts as these, and the simple machine for gauging the violence of the shocks, illustrated in another column, may hereafter play an important part in giving such training, since it appears capable of furnishing something like a universal standard for which the Burlington tests will furnish a maximum of efficiency.

No doubt, after all allowances are made, the existence of slack in long trains will be a considerable disadvantage for working continuous brakes on them, and perhaps enough so that, if cars were built for the sake of stopping them easily instead of for the sake of starting them and running them easily, it would be decisive. As, however, the true question is how to start and haul as many as possible, and as there is at least a very fair possibility that taking out all slack from freight trains means a diminution of 10 or 20 per cent. in the load hauled, it is fortunate that the case is not to go by default by the practical impossibility of working power brakes on long trains with slack.

An effort is to be made in the coming week to determine definitely just what is the effect of eliminating slack from trains of 50 cars, by taking out the slack with blocks and trying some further "emergency" stops, which have otherwise been abandoned. No one can yet predict it precisely. There is great danger of over-hasty reasoning from passenger practice to freight practice in this respect. The trains which are now being tested at Burlington, and which must continue to be handled in practice on thousands of miles in this country, weigh some 1,670 tons, equivalent to a train of 50 Pullman cars. In view of the experience at Burlington, that difficulties arise with 50 cars which hardly appear at all with 25 cars, is any one prepared to predict, from experience with 12 or 14 Pullmans at most, what would be the effect of violent application of brakes on the rear car of a train of 50 Pullmans, or that because the tight coupling has no injurious effect on the ordinary passenger load hauled, but rather a beneficial one, it would likewise have no injurious effect on a train of 50 heavy Pullmans to be hauled at slower speed? The truth is that there is floating through the mind of many of those who favor *freight* couplings without any slack, a vague notion that if freight trains can be run at higher speed and so move more tons per year, a loss of 10, 20 or 30 per cent. in average load per trip could be afforded. As a mere question of dollars and cents, no error can be more grave or dangerous, as will be found if the realm of vague guess-work is abandoned for that of definite fact. The question, however, is too large a one to consider further now.

Another question which may be considered as settled is that the supposed difficulty of applying and releasing continuous brakes on trains of 50 cars, or even much longer trains, is practically non-existent, when all is in good order, nor does any reason appear why any more serious difficulties should arise with freight trains than with passenger trains in keeping all in good order, since the train pipe and couplings are the only parts seriously affecting the working of the brakes as a whole. If two or three or even six cars in a dozen have their special reservoirs and brake-gear a little out of order, the disadvantage can be borne, since these parts are not links in the chain, but separate attachments. The leakage from the brake-pipe will of course be five times as great with 50 cars as with 10, but as this loss is small and already guarded against by a leakage valve, the apprehensions which have been felt in this respect are happily relieved.

Another question which we feel justified in saying may be considered as settled is, that buffer brakes of any kind which take their power directly from the pressure on the draw-bar—being on when the buffer is compressed, and off as soon as it is not—cannot be safely used on every car of trains of any length with slack couplings, and will not exert an even approximately equal pull on the draw-bar during a stop under any ordinary conditions if applied to all the cars. It is probable that with a certain number of cars at the rear cut out, and acting without brakes, the violent jerks at the rear, which have proved so serious at Burlington, will be very greatly ameliorated, and perhaps practically disappear. A test of this kind with all the brakes on the ground is to be made this week. It is also quite possible that some simple device may be inserted by which the brakes, once on, will be held on during the stop, regardless of the action of the buffer. We must not therefore be understood to imply that the case against buffer brakes is closed; but we risk little in saying that the brakes on the ground cannot be made to work satisfactorily on entire long trains by mere modifications of detail, but only by some addition to or subtraction from their present essential details which will modify their mechanical action.

This we take to have been clear to every disinterested person who has studied their action on the ground, because their defective action is primarily due to this, that the very fact that the brakes have gone on tends to destroy the force—the compression of the draw-bars—which puts them on. One of the most striking evidences of this is that the most violent blows come, not when great forces are acting, as in stops at speed, but when the train is being simply handled down a grade or through a yard, or almost coming to a stop. The buffer-brakes, however, have so much in their favor on the score of simplicity and convenience during the transition period when some cars will have power brakes and some will not, and they behaved so well—at least the American brake did—in the 25-car tests with all cars braked, that their behavior in the coming 50-car tests, with the 20 rear cars cut out, will be watched for with general interest, and suspension of judgment until these tests are concluded, and possibly longer, is plainly demanded.

TRUNK LINE THROUGH FREIGHT MOVEMENT—JUNE AND THE HALF YEAR.

The through shipments of freight from New York to the West (to or beyond the western termini of the trunk lines) in June were much larger than in May, and though not so large as last year in June, were larger than in most previous years. For seven years they have been in June, in tons:

1880.	1881.	1882.	1883.	1884.	1885.	1886.
72,444	85 943	126,6.0	92,106	88,069	101,595	89,565

In 1882 and 1885, the only years when this year's June shipments were exceeded, the rates were more than 40 per cent. lower than they are now, and the railroads carried much traffic that usually goes by canal.

For the six months ending with June these New York shipments to the West have been:

Years.	Tons.	Years.	Tons.
1879	368,398	1883	509,510
1880	510.111	1884	595,125
1881	536,420	1885	580,046
1882	820,568	1886	533,295

For the half year the shipments thus were 8 per cent. less than last year, 10 per cent. less than in 1884, 35 per cent. less than in 1882 and a trifle less than in 1881. Of the 46,751 tons decrease from last year, 31,255 tons was in May and June, and is due doubtless to larger canal shipments this year.

The total trunk line shipments to the West from the four seaboard cities, New York, Boston, Philadelphia and Baltimore, together with a large number of New England points, which together ship about one-third as much as Boston, have been in June:

Year.	Tons.	Year.	Tons.
1880	137,578	1884	153.948
1881	156.453	1885	171 379
1882	223,538	1886	158,289
1883	155,657		

The June shipments this year were exceeded only in 1882 and 1883, when the rates were at their lowest, but compared with last year all places except New York shipped 68,724 tons this year, against 69,784 last—further evidence that the chief effect of the low rates last year was to attract canal freight.

At the current rates the shipments must have yielded about $1,615 this year for every $1,000 last.

For the six months ending with June these trunk shipments from the seaboard to the West have been, in tons:

Year.	Tons.	Year.	Tons.
1880	941,015	1884	990.102
1881	930,014	1885	964,393
1882	1.312,010	1886	915,151
1883	922,959		

Thus the shipments this year have been less than in any other of the seven. The decrease from last year is fully accounted for by the lower rates. The total movement of goods to the West was probably smallest last year; but the decrease from previous years cannot be accounted for in that way. It indicates that the movement of merchandise from the East to the West is not a growing one. This year there have been larger shipments of iron, imported and other, than for two or three years previous, and our total exports have been considerably greater than last year, but this has not prevented a decline in the west-bound movement of freight by rail. Compared with previous years since 1881, the decrease has been greatest, comparatively, in the New York receipts, but compared with 1880 and 1881 it has been greater elsewhere. New York's shipments are more largely imported goods than those of any other city, and the varying quantity of imports thus affects its business most.

In a country where the population grows as rapidly as it does here, some increase in traffic is to be expected in every period of a few years, though, of course, not every year. But the period covered by the above figures was one of a decline in prosperity until this year, at least, and these shipments are in some proportion to the prosperity—the purchasing ability—of the country at large. Our exports culminated in 1880 and 1881, and though there was great activity in some industries (particularly in railroad building) a year longer, the country has been feeling poor ever since. The increase for a few years before 1881 was rapid, but statistics were not recorded then, except for New York, whose shipments were:

	1877.	1878.	1879.	1880.	1881.
First half	no report	354.938	368,398	510,011	536.420
Last half	389,341	385,610	462,821	512.634	706,041

Business was at its very worst in the first half of 1877, but was greatly stimulated in the last half of that year by good crops and a foreign demand, which made high prices, and for three more years crops were good and exports very large, the effect of which is seen in the increase of 44 per cent. in the west-bound shipments from the first half of 1878 to the

first half of 1880, or, better, by the increase of 32 per cent. from the last half of 1877 to the last half of 1880.

But, after growing with this great rapidity until 1880, it has since not much more than held the position then gained. In the last half of last year there was an important gain, the *total* through shipments west by the trunk lines since 1881 having been, in the *last half* of the year:

1882.	1883.	1884.	1885.
1,057,889	967,300	930,743	1,081,232

so that in the last half of last year they were 16 per cent. more than the year before, and larger than in any other year except 1881, when they were made abnormally large by the low rates of the railroad war. Doubtless they were increased to some extent last year also by low rates, but it was particularly noticeable that the shipments continued to be much larger than in 1884 after rates were advanced.

The promise, then, of an early restoration of great activity and prosperity has not been kept, and, as we have seen, these significant shipments were not quite so large in the first half of this year as they had been in previous years since 1879.

So far as the business affects the separate railroads, it must be remembered that there are two more of them now than there were before 1883, and that these two carry 22 per cent. of the New York shipments, but a considerably smaller share of the total trunk-line shipments.

The *west-bound* movement over the trunk lines reported below includes all freight shipped from the western termini of the trunk lines, or places further west, for any distance over a trunk line. Much the larger part of it goes through to the seaboard, but not a little is to places in the interior of New York, Pennsylvania and New England. These east-bound shipments have been in June, in tons:

Year.	Tons.	Year.	Tons.
1880	1,095,035	1884	910,332
1881	1,047,917	1885	881,162
18 2	718,815	1886	950,000
1883	717,805		

Thus the June east-bound movement this year was the largest since 1881, and was 7.8 per cent. more than last year and 4½ per cent. more than in 1884, when rates were 40 per cent. lower than this year. Compared with 1880 and 1881 the decrease to the old trunk lines is important, but the total business was decidedly large this year.

For the six months ending with June this east-bound movement has been:

Year.	Tons.	Year.	Tons.
1880	5,117,236	1884	4,661,800
1881	5,222,193	1885	5,652,947
1882	4,154,179	1886	5,241,347
1883	4,781,474		

Thus the movement this year was exceeded only last year, and then by less than 8 per cent., while compared with 1884 there is an increase of 12½ per cent., though rates were very much lower in 1884 and 1885 than this year, and also in 1882. This movement, the largest single traffic movement anywhere reported, is thus very large this year. It has averaged 4,976,000 tons for the last seven years, and therefore was 5½ per cent. more than the average this year. Still it is a disappointment to those who thought that the rate of growth from 1877 to 1880 would continue.

The movement was not recorded then, but it growth was enormous, and it was the seed from which the heavy west-bound traffic and the general prosperity of the country grew. It is reasonable to expect that it will continue to be large in the last half of this year, and then be larger than last year.

THE NATIONAL EXPORTS AND IMPORTS.

The value of the exports of the United States last June was larger than in any previous month of this year except January, while last year the exports were less in June than in any previous month of the year. On the other hand, the value of the imports last June was less than in any other month of this year except January and May, and a little below the average for the half-year, but much more than last year and a little more than in 1884. The exports of merchandise in June, the six months ending with June and the fiscal year ending with June, have been for six years in *millions* of dollars:

To June 30:	1881.	1882.	1883.	1884.	1885	1886.
Month	63.5	51.1	54.4	53.3	48.5	55.8
Six months	425.4	342.4	398 2	343.5	336.3	3?7 5
Year	902.4	750 5	823 8	740.5	742 2	679.4

Thus, though the exports for the entire year ending with June last were the smallest (in value) for the six years here reported (also smaller than for the three years previous to 1881), and the exports for the half-year also slightly less than in any of the five years previous, in June they were the largest since 1881, and this in spite of very low prices for all our chief exports. Indeed, an inspection of the exports by months shows that the marked decline in them extended down to the close of the first *quarter* of the year, the exports for the successive quarters having been, in *millions* of dollars:

3 *mos. to*	1881.	1882.	1883.	1884.	1885.	1886.
March 31	226.9	184.1	224.9	191.4	185 9	163.6
June 30	198 4	158.3	173.3	152.1	150.4	163.9

Thus in the first quarter of this year the exports were decidedly less than in any other of the six years: while in the second quarter they were larger than in any other except 1881 and 1883. It is also noticeable that this year the exports were a trifle larger in the second quarter than in the first, while in all the other years they have been much the larger in the first quarter—from $25,800,000 to $51,600,000, or from 16 to 30 per cent. larger. This shows that there was a decided revival of exports in the last quarter of the year, which is naturally a quarter of light exports, the bulk of the cotton, wheat and flour from the previous crop having already been marketed. The cause probably was that unsatisfactory prices had caused cotton and wheat to be held back to an unusual extent. Actually, though the wheat and flour exports for the whole of the past year were much less than in many previous years, for the three months ending with June they make a very favorable comparison, having been, in *bushels:*

Year:	9 months to March 31.	3 months to June 30.	12 months to June 30.
1886	58,997,922	34,599 698	93,597.620
1885	105,595,426	23,417,918	129,013,344
1884	83,532,148	23,896 295	107,428.443
1883	128,601,424	19.209,892	147,811,316
1882	101,048,425	20,843,964	121,892,389
1881	146,531,765	39,799,849	186,331,614
1880	136,444,317	43,859,859	180,304,176
1879	115 448,997	32,238,652	147,687,649
1878	69,953,288	23,186,008	93,139,296

Thus while the wheat and flour exports during the first nine months of the fiscal year were very much less than in any other of the last nine years, and no less than 44 per cent. less than in the corresponding nine months of the previous year, in the last three months they were the largest since 1881 and 1880, when they were the largest known in the whole history of the trade. The change is astounding. The average monthly exports during the first nine months of last year, during which the bulk of the crops is usually marketed, were only 6,555,000 bushels; in the last three months, 11,533,000 bushels. How unusual this is may be seen by the following statement of the percentage of the exports of the whole fiscal year which was made in the last three months of it:

Year to June 30.								
1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.
24 9	21.8	24.3	21.4	17.1	12 3	22.1	18.1	37.0

Thus during the previous fiscal years the proportion of the year's exports shipped in the last quarter had varied from an eighth to a quarter, while this year it was nearly three-eighths.

These large wheat exports just at the end of the crop year, which was, with one exception, the most unfavorable crop year for a decade, simply absorbed a great surplus stock which the country had held since the harvest of 1884. It has doubtless had a very considerable effect on trade, though these exports were at very low prices.

Another delayed export, if we may so call it, was cotton. The exports of this for the seven months of the crop year to March 31, and for the three months to June 30, have been, in *thousands* of pounds:

	1885.	1886.
7 months to March 31	1,609,314	1,585,099
3 " " June 30	191,600	406,990
Ten months	1,800,914	1,992,089
P. c. in last 3 months	10.6	20.4

Thus in the first seven months of the crop-year the exports were less than last year, while in the next three months they were more than twice as great as last year. The *value* of the cotton exports in the last three months was $40,088,174 this year, against $21,003,589 in 1885 and $20,709,595 in 1884. So large exports of cotton so late in the season are very unusual.

This is all business which ordinarily would have been done earlier in the fiscal year, and coming then it would not have been noticeable, for after all the recovery in the last three months, we see that the exports of the whole fiscal year were not heavy, but were unusually light. It is quite probable that the renewed activity in business which was so marked in the latter part of last year led many to believe that a period of great prosperity had but just begun, the result of which would soon be felt in a great demand for nearly all commodities and in higher prices for them; and that for this reason wheat and cotton were held longer than usual. Whatever the reason, it is questionable whether the result has not been favorable to the community. It made business lighter last fall and winter, when the public sentiment was too sanguine, and it greatly improved business during the last three months, when but forthe revival of exports it would probably have been very dull.

Imports are likely to be large when the country is prosperous and confident, which is not always when exports are large.

Our national imports exceeded our exports in every year from 1868 to 1873, inclusive, and also in 1874–75; but while exports increased greatly from 1875 to 1879, imports decreased, and they have again fallen off greatly since 1882–83. The values of imports in June and in the six months and the 12 months ending with June, have been, in *millions*, as follows:

To June 30:	1881.	1882.	1883.	1884.	1885.	1886.
Month	58.9	62.7	64.8	52.2	49.3	54.1
6 months	327.4	381.8	352.1	332.8	281.0	328.4
Year	642.7	724.6	723.2	667.7	577.5	635.3

Thus the year's imports, which had fallen off 55½ millions from 1883 to 1884, and again 90 millions from 1884 to 1885—a decline of one-fifth in two years—increased 57¾ millions last year, in spite of the decrease of 62¾ millions in exports.

It was confidence rather than prosperity that caused this increase in imports, one indication of which is that in the three months, November to January, inclusive, the imports *increased* 26.6 millions (15.8 per cent.), while the exports at same time *decreased* 51 millions (25½ per cent.). And recently, when the exports have been more favorable, the imports, though larger than last year, have not been as much larger as they were earlier in the year. Thus, in the first three months of 1886, the imports were 26.9 millions more than last year; in the next three months, 20.5 more; while the exports were 22.3 millions less than last year in the first three months, and 13.5 millions more in the next three. The import and export values were very nearly equal in each of these quarters in 1886.

This again may be looked upon as favorable, namely, that when exports actually became large imports were not increased. These large exports had been anticipated.

The values of the exports and imports, and the excess of one over the other have been, in each of the last 17 fiscal years ending with June, in millions of dollars:

Year to June 30.	Exps.	Imps.	Excess of
1870	392.8	436.0	Imp. 43.2
1871	442.8	520.2	" 77 4
1872	444.2	626.6	" 182.4
1873	522.4	642.1	" 119.7
1874	586.3	567.4	Exp. 18.9
1875	513.4	533.0	Imp. 19.6
1876	540.4	460.7	Exp. 79.7
1877	602.5	451.3	" 151.2
1878	694 9	431.1	" 257.8
1879	710.4	445.8	Exp. 264.6
1880	835.6	667.9	" 167.7
1881	902.4	642.7	" 259.7
1882	750.5	724.6	" 25.9
1883	823.8	723.2	" 100.6
1884	740.5	667.7	" 72.8
1885	742.2	577.5	" 164.7
1886	679.4	635.3	" 44.1

Thus the value of exports last year was the smallest since 1877, but the value of imports was larger than the year before, and larger than in any year previous to 1880 except 1872–73. Since 1875 the excess of exports over imports has but once (in 1881–82) been so small as last year. Since 1880–81, when the exports culminated, they have decreased no less than $223,000,000, which is nearly 25 per cent., and meanwhile the imports have decreased by $7,400,000, or little more than 1 per cent., though since the imports culminated in 1881–82, the decrease in them has been $89,300,000, or 12½ per cent.

It is easy to exaggerate the importance of the decrease in the excess of exports; we were probably paying off European debts (largely by buying American securities held in Europe) when the excess was greatest, and owe much less there now than formerly; but the fact of a smaller foreign commerce is unmistakable and important, especially as our population has been growing fast all the time. Its varying importance to each person is best expressed by the value of exports and imports *per inhabitant*, which has been as follows:

	1870.	1873.	1878.	1880.	1881.	1883.	1885.	1886.
Exports	$10.19	$12.40	$14.61	$16 66	$17 41	$14 89	$12.68	$11.32
Imports	11.31	15.23	8.07	13.31	12.40	13.07	9.88	10.59

Thus the exports per inhabitant have decreased 35 per cent. since 1881, and last year were the smallest since 1872, while the imports per inhabitant were 14½ per cent. less than in 1881 and 18 per cent. less than in 1883. Considering values, the recent changes in *quantities* must have been much less, for prices of both exports and imports have been very low for the last two years. Notwithstanding, the foreign commerce is doubtless relatively less important now than formerly. We consume more of our own products (chiefly agricultural) and fewer foreign manufactured goods in proportion to our population. But the foreign commerce remains of great importance, and under certain circumstances may occasion a very great and favorable change in the course of business.

The Houston & Texas Central Bonds.

The proposition for a readjustment ofthe rates of interest on the various classes of bonds of the Houston & Texas Central Company, to accept which seems to be regarded by many bondholders as the best they can do, illustrates the insecurity of many so-called American railroad securities, and shows why, in spite of the great progress which most of our companies have made in credit, American railroads as a whole still pay much higher rates for borrowed money than most European and especially English companies. Th

Houston & Texas Central was the first railroad built in Texas, and occupies the most populous and productive part of that state. Until 1885, including the bad years from 1874 till 1879, the interest on all classes of its bonds was promptly paid, and such meagre reports as were made indicated that the interest was more than earned. Suddenly the payment of interest was suspended, beginning not with the "general" mortgage (which is virtually a third mortgage) nor with consolidated or second-mortgage, but with the first-mortgage bonds. The property is unquestionably worth much more than the first-mortgage bonds, but after the company has failed to pay four coupons, many at least of the holders of these bonds have concluded that it will be better for them to accept 6 per cent. interest in lieu of the 7 promised, and to take that for two and a half years in a 5 per cent. debenture, which can hardly be worth par, rather than enforce the rights which their mortgage gives them.

The holders of the second (consolidated) bonds fare much worse, though they, of course, had not the same reason as the holders of the firsts to believe that they were fully protected. Their interest (8 per cent.) had always been paid, however, until the coupon of April, 1885, was due. Now they are asked to take 5 per cent. instead of 8 for the remainder of the life of their bonds (till 1912), and to fund two years' interest at that rate. The general mortgage bonds were issued only a few years ago, but when issued investors were assured that they were perfectly secured. They can get 4 per cent. for their 6s, and fund four coupons, getting better terms than the seconds, which are asked to forego 37½ per cent. of their interest, though they have the prior mortgage and are secured by a land grant as well as the road. These general mortgage bondholders, however, ought to be able to make things very disagreeable to the management which issued the bonds and sold them on the strength of reports which represented the net earnings to be much above the fixed charges, if the later statements are correct, which show that the net earnings then reported were made large by excluding from working expenses expenditures for maintenance and renewals. All money received for bonds sold because of such reports of net earnings was money obtained on false pretenses. This, however, does not make the rights of the general mortgage bondholders any the greater as against holders of prior liens, and it is supposed that not many of the general mortgage bonds were taken by the public, but that they were largely taken as collateral by the managers and large stockholders for moneys advanced for pressing needs, and did not cost them very much.

Now, the only reason why the holders of the prior liens are likely to accept so great a reduction in the interest due, is either that their liens are not what they were supposed to be, or that they find difficulty in enforcing them. As to the latter, there seems to have been but little coöperation of the Houston & Texas Central first-mortgage bondholders. These bonds seem to be much scattered, few persons holding any considerable number, and usually it is large holders which take the lead in any movement to enforce rights under a mortgage; but there is also reason to believe that the mortgage is so drawn as to make it questionable whether the holders under it could sel the road to satisfy their claims, and this doubt naturally leads them to favor a compromise. Moreover, these holders are offered something in return for what they are asked to give up. Their bonds only run till 1891, and they are offered an extension for ten years; and as good 6 per cent. bonds are worth much more than par, this extension has a considerable value *if the bonds are secure.* For instance, the Chicago & Northwestern's Cedar Rapids & Missouri first 7s, due 1891, now sell for about 111 and interest, while its Escanaba & Lake Superior 6s, due 1901, bring 117. Further, the reduced interest is guaranteed by the Southern Pacific Company, which works the line from New Orleans to San Francisco and also the Central, and owns a majority of the stocks of the companies forming the line, except the Central Pacific, which have a face value of $112,000,000, but a comparatively small actual value, as dividends are paid on only $4,000,000 of these stocks.

The consolidated bonds are a long bond, and if issued by a company in good credit would probably be worth 140 or more.

The result of the arrangement offered to the Houston & Texas Central Company will be as follows:

Interest on	Reduced—From	Reduced—To
$6,154,000 1st mortgage main line 7s	$430,780	$306,240
2,271,000 1st mortgage W. Div. 7s	158,970	136,260
1,140,000 1st mortgage W. & N. W. 7s	79,800	68,400
4,046,000 consol. 8s	323,680	202,300
4,326,000 general mortgage 6s	259,560	173,040
$17,937,000	$1,252,790	$949,240

While there will be borrowed from the bondholders to pay the interest due them, that will be past due Jan. 2 next:

Of first-mort. bondholders, 17½ per cent. of their holdings	$1,073,875
Of consol. holders, 16 per cent. of their holdings	647,360
Of gen. mort. bondholders, 12 per cent. of their holdings	531,120
Total	$2,852,355

For which "forced loan" the bondholders will receive in 5 per cent. debentures:

First mortgage	$1,434,750
Consolidated mortgage	404,600
General mortgage	354,080
Total	$2,193,430

Then the annual interest charges of the company, including these debentures, will be $1,058,911, or $193,879 *less* than before this loan of $2,850,000 was obtained from the bondholders, whose liens on the property and power to secure their rights will remain precisely as before, with the exception of the guarantee of interest by the Southern Pacific Company. The bondholders will have advanced the money for the improvement of the property, and if it is thereby enabled to earn more than the reduced rate of interest, the stockholders will get the whole benefit of it.

Eleven more railroads report for June this week, and among them the two with largest earnings of all the reporting roads—the Pennsylvania and the Reading and also the Erie. Like the other roads that have reported for June, they made great gains over last year, amounting in all to 10¾ per cent., most of which was due to the Pennsylvania Railroad, which gained 16 per cent., and the Erie and its leased line, which gained 30¾ per cent. The other large gains were 23½ per cent. by the Nashville & Chattanooga and 29 by the St. Joseph & Grand Island. The only decreases are 27 per cent. by the Mississippi & Tennessee, and 6¾ by the Susquehanna & Western.

The Northern Central Railway does not keep pace with the Pennsylvania either in earnings or net earnings, though the Northern Central carries a good deal of through freight, and should with the Pennsylvania sympathize with the condition of business in Eastern Pennsylvania and with the coal and iron business. Nevertheless, while the Pennsylvania gained 16 per cent. in gross and 48½ per cent. in net earnings in June over last year, the Northern Central gained but 4 per cent. in gross and lost 29¾ in net earnings. On the other hand, the Northern Central had no decrease last year from 1884, when the Pennsylvania had a large one. The Reading gained moderately in June over last year, when it gained largely over 1884.

We have now had reports of June earnings from 77 railroads, and their aggregate earnings have been:

	1886.	1885.	Increase.	P. c.
Earnings	$31,791,060	$28,252,406	$3,538,654	12.5

This is certainly a very large gain, but it includes the West Shore this year and not last, when it probably earned about $300,000. Last year the 85 roads reporting earned $749,148 less than in 1884, and in 1884 76 roads reporting for June earned $1,850,496 less than in 1883.

The American Exhibition, which was to be held this year, has been postponed until next year, when it is to be opened May 2 at Earl's Court, Kensington, London. The managers of the exhibition claim that this will be the best opportunity to exhibit our industries and resources to foreigners, and especially to the English and the residents of the English colonies, that has ever been offered; and there is no doubt that the four successive special exhibitions held in London in so many years, the Fishery Exhibition, the Exhibition of Sanitary Appliances, the Exhibition of Inventions, and the Colonial and Indian Exhibition (known popularly as the "Fisheries," the "Healtheries," the 'Inventories," and the "Colonies"), have established a habit of visiting exhibitions, as it were, in London. The success of the American exhibition, however, will depend chiefly on the Americans who have something to exhibit; and not many of these are likely to go to the expense of exhibiting unless they have, or think they have, a chance to sell their goods in foreign markets. We are one of the great exporting nations of the world, but the great bulk of our exports consists of a few staples—grain, flour, cotton, cured meats, tobacco and petroleum—which do not afford material for a very attractive exhibition. There are, however, considerable and various exports of manufactured goods and machinery, though those which are exported would form a very inadequate idea of the variety and importance of our manufactures. In railroad appliances, machinery and materials we could make a great display; but if nothing is sent except what we export, the showing will be much more limited. A full display would be very interesting, of course, especially to Europeans.

Mr. A. T. Gosborn, who was Director-General of our Centennial Exhibition, is announced as President of the General Council of the American Exhibition, and among the directors John B. Carson and Geo. M. Pullman, of Chicago, are well known railroad men.

Pennsylvania Railroad Earnings and Expenses in June.

The statement of earnings for June is favorable, and compared with last year there is an enormous gain in net earnings, which might lead one to suppose that there had been a sudden revolution in the condition of things, while in fact the net earnings were 9 per cent. more in May than in June, and the greatness of the gain in the latter month was due chiefly to the fact that the net earnings in that month last year (as we have already noticed) were exceptionally small, as they were also in 1884 and 1883.

The gross and net earnings and working expenses in June of the lines east of Pittsburgh and Erie for 13 successive years have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1873	$3,527,427	$2,845,562	$681,865
1874	3,198,989	2,150,146	1,048,843
1875	2,966,345	2,031,749	964,596
1876	2,940,192	1,959,180	981,012
1877	2,446,176	1,612,828	833,348
1878	2,380,200	1,475,867	904,333
1879	2,390,809	1,789,815	600,994
1880	3,221,477	2,209,232	1,012,245
1881	3,807,438	2,318,902	1,488,536
1882	4,093,757	2,559,431	1,534,326
1883	4,156,872	2,977,737	1,179,135
1884	3,906,175	2,823,156	1,083,019
1885	3,735,639	2,826,202	909,437
1886	4,336,102	2,984,976	1,351,126

Thus the gross earnings were larger last June than in any other—even 4⅕ per cent. more than in 1883; the largest heretofore. The working expenses were also larger than ever before, but only $7,239 more than in 1883, but the net earnings, though nearly one-half more than last year, were considerably less than in 1881 and 1882. The increases over last year were:

	Gross earnings.	Expenses.	Net earnings.
Amount	$600,463	$158,774	$441,689
Per cent	16.1	5.6	48.6

Meanwhile the surplus or deficit of the lines *west* of Pittsburgh and Erie has been in June:

1879	Deficit	$252,387	1883	Deficit	$176,290
1880	Surplus	46,877	1884	"	311,907
1881	Deficit	28,905	1885	"	401,830
1882	Surplus	103,778	1886	"	215,400

Adding the surplus and subtracting the deficit of the Western system from the net earnings of the Eastern system, we have as the company's income from both systems:

1879	$348,607	1883	$1,002,845
1880	1,059,122	1884	771,112
1881	1,459,631	1885	507,607
1882	1,430,548	1886	1,135,726

This shows a gain of 125 per cent. over last year, 47 per cent. over 1884, and 13 per cent. over 1883, but a decrease of 20½ per cent. from 1882 and 22 per cent. from 1881.

For the six months ending with June the gross and net earnings and working expenses of the lines east of Pittsburgh and Erie have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1877	$14,336,396	$9,606,977	$4,729,419
1878	14,451,938	9,106,040	5,345,898
1879	15,414,058	9,568,203	5,845,655
1880	19,434,071	11,339,662	8,094,409
1881	21,553,839	12,556,685	8,997,154
1882	22,650,853	14,460,934	8,189,919
1883	24,352,586	15,833,962	8,518,624
1884	23,333,256	15,221,216	8,112,040
1885	21,319,600	14,799,942	6,519,658
1886	23,250,171	15,580,547	7,669,631

The gross earnings were slightly exceeded in 1883 and exceeded by 4½ per cent. in 1882, but equaled in no other year in the history of the company. The gains over last year are:

	Gross earnings.	Expenses.	Net earnings.
Amount	$1,930,571	$780,605	$1,149,973
Per cent	9.0	5.3	17 6

Nearly one-third of this gain in gross earnings and 38½ per cent. of this gain in net earnings for the half-year was made in June.

The surplus of the lines *west* of Pittsburgh and Erie over all obligations of interest, rentals, etc., or the deficit in meeting them, has been for the half-year:

1879	Deficit.	$419,337	1883	Surplus.	$215,674
1880	Surplus.	1,341,107	1884	Deficit.	764,855
1881	"	1,524,864	1885	"	987,090
1882	"	35,463	1886	"	650,198

This makes the profit from both systems for the half-year:

1879	$15,426,318	1883	$8,734,298
1880	9,435,516	1884	7,347,185
1881	10,522,018	1885	5,532 568
1882	8,225,382	1886	7,019,426

The gain over last year is $1,486,858, which is about 1½ per cent. on the stock now outstanding. Yet these profits are smaller than in any other year since 1879, and the decrease since 1883 is 1¾ per cent. on the stock now outstanding. Of the gain in the profits of the two systems for the half year, three-sevenths was made in June.

If this rate of gain were to continue, in a few months the results would be marvelous. But it cannot continue. Not that the earnings may not be as large as they have been or larger. After July they are usually larger than in earlier months; but the later months last year were not so unfavorable as June, and after August they were larger than in 1884.

The net earnings of the eastern system in the first half and last half of the year have been:

Half:	1882.	1883.	1884.	1885.	1886.
First	$8,189,919	$8,518,624	$8,112,040	$6,516,658	$7,669,631
Second	10,242,310	10,817,478	9,927,862	9,618 611	.....

Last year in the first half the net earnings were $1,595,382 (nearly 20 per cent.) less than the year before; in the last half they were only $320,251 (3⅛ per cent.) less. Should the Pennsylvania's earnings for the second half of this year be equal to the largest ever known (which is possible), in that case even the gain over last year would be much less than it was in the first half of the year.

Erie Earnings in June.

The New York, Lake Erie & Western report of June earnings is only less favorable than the extraordinary one of May earnings. For the nine years since the reorganization the gross and net earnings and working expenses of the Erie proper in June have been:

Year.	Gross earnings.	Expenses.	Net earnings.
1878.	$1,258,990	$772,680	$486,310
1879....	1,230,419	939,896	290,523
1880.....	1,691,812	945,794	746,018
1881.....	1,794,982	1,063,752	731,230
1882	1,756,684	1,070,822	685,862
1883....	1,663,038	1,095,020	568,018
1884.....	1,281,157	920,529	360,628
1885	1,202,186	839,426	362,760
1886	1,536,808	986,747	550,061

The gross earnings are the largest for three years, but smaller than in any of the four years previous; there is a large (and healthy) increase of expenses over last year, and the net earnings, like the gross, are the largest for three years, but smaller than in any of the four years from 1880 to 1883. The gains over last year are:

	Gross earnings.	Expenses.	Net earnings.
Amount.....	$334,622	$147,321	$187,301
Per cent.....	27.8	17.5	51 6

The leased New York, Pennsylvania & Ohio road also earned much more this year than in 1885 or 1884, its earnings in June since the lease having been:

	1883.	1884.	1885.	1886.
Gross earn.....	$580,160	$424.133	$367,274	$515,730
Expenses	346,805	336,284	296,984	345,181
Net earn.....	$233,355	$87,849	$70,290	$170,549
Rental	185,651	135,723	117,517	165,033
Balance.....	(P.) $47,704	(D.) $47,874	(D.) $47,237	(P.) $5,516

This makes the Erie's increase in June from the two systems:

1883.	1884.	1885	1886.
$615,722	$312,754	$315,523	$555,577

—nearly 80 per cent. more this year than last year or the year before.

For the nine months of its fiscal year ending with June the earnings and expenses of the Erie proper have been:

Year.	Net earnings.	Expenses.	Net earnings.
1877 78.....	$11,990,504	$8,317 397	$3,673,707
1878-79...	12,042,813	8 702 898	3.339,915
1879-80 ...	14,095,485	8.928,355	5,167 130
1880-81.....	15,891,798	10 207,878	5,683,920
1881-82.....	14,874,929	10.113,223	4,761,706
1882-83.....	14,706,377	10,204,854	4.501 523
1883-84.....	12,893,625	9.262,465	3,631,160
1884-85.....	11,239,552	7,986,931	3,252,621
1885-86.....	13,224,097	8,666,367	4,557.730

Thus the gross earnings this year were the largest since 1883, and the net earnings the largest since 1884, and the increase in the latter over last year is $1,305,109, or 40 per cent.

Meanwhile the profit or loss on the leased Ohio road has been.

1882-83.	1883-84.	1884-85.	1885-86.
(Prof.) $101,891	(Loss) $321,957	(Loss) $117,176	(Prof.) $44,433

Making the net result to the Erie for the nine months:

1882-83.	1883-84.	1884 85.	1885-86.
$4,603,414	$3,309,202	$3,135,447	$4,602,163

The gain over last year is $1,466,717, or 47 per cent., which is nearly equal to the interest on the second consolidated bonds for the three quarters of the year. A corresponding improvement for the remainder of the fiscal year is probably not to be expected, as the earnings in the last two months of that year were not so very bad last year as they had been earlier. For the last three months of the year the net earnings of the Erie proper have been:

1881.	1882.	1883.	1884.	1885.
$1.931,460	$2,288,628	$2 518,349	$1,918,473	$1,574 256

An increase of 40 per cent., as in the previous nine months would bring these up to $2,204,000. The result will be very good if they reach within $100,000 or $200,000 of this.

The signs of the movement of the new wheat crop which we found at St. Louis in the week ending July 10, are seen there still more emphatically in the following week, and also at Toledo, and to some extent at Detroit and Chicago. The St. Louis receipts in the single week ending July 17 were as large as for the 18 weeks, or *four months*, ending July 3; and the Toledo receipts larger than for the eight weeks ending July 10. The total wheat receipts were more than twice as great as in any week previous to July this year, and were exceeded last year only in two weeks in October. St. Louis has not had so large wheat receipts before since 1883. Meanwhile corn receipts keep up large, and the total Northwestern grain receipts have become positively large—larger than in any other week of this year except one.

In this week to July 17 the new wheat crop was also felt first at the Atlantic ports, and, as usual, largely at Baltimore, but also largely at New York, which is not usual so early. Thus the wheat receipts at New York, Baltimore, Philadelphia and the eight Atlantic ports in successive weeks have been:

	Week ending				
	June 19.	June 26.	July 3.	July 10.	July 17.
New York.....	1,200,740	877,502	294,550	651,150	1,028,100
Baltimore.....	52,016	46,032	32,777	80,856	399,524
Philadelphia..	80,072	23,100	17.105	7,921	70,903
8 At. ports..	1,587,072	1,063,584	486,405	915,237	1,588,621

Possibly the larger receipts at New York in the last week were simply a recovery of business which had fallen off for a little; but the Baltimore receipts were more than twice as great as in any other week of this year and more than for the entire six weeks previous.

Boston & Maine stock, which has for years paid 8 per cent., and has lately increased its dividends to 9 per cent., sold last week in Boston at 207½, at which price it will, if the dividends continue at the present rate, as seems altogether probable, pay 4.34 per cent. on the investment. The amount of this stock on the market is not large, as the total amount is only $7,000,000 and it is largely held for investment. This is claimed to be the highest price ever paid for a New England railroad stock, except for that of the Concord Railroad, which has recently sold for 215, at which price it would pay 4.65 per cent. on its cost. The Concord is a steady 10 per cent. stock, and its price is also kept up by the exceptional position of the road, which makes its control desirable to more than one party. New York, New Haven & Hartford, which is also a steady 10 per cent. stock and is very seldom on the market, was quoted recently at 206 bid and 210 asked; at the asking price it would pay its purchaser 4.76 per cent. yearly. United New Jersey, which is guaranteed 10 per cent. by the Pennsylvania Railroad Company, sold last week at 220 in Philadelphia, and at that price returns 4.55 per cent. yearly.

These four are undoubtedly the highest-priced railroad stocks in the United States. As might be expected, they are all investment stocks and are not dealt in speculatively to any extent.

The New Hampshire syndicate which controls the Concord Railroad, and which recently secured a controlling interest in the Boston, Concord & Montreal, is credited by Boston report with the intention of transferring its ownership to the Boston & Maine. Should the lease of the Montreal road to the Boston & Lowell be set aside by the New Hampshire Supreme Court in the suit now pending, the Concord Company will take possession, and thus control a connection with the Central Vermont and the southern outlet of the Passumpsic line to Montreal. A Boston connection for this line, independent of the Lowell road, can readily be made by the use of the Manchester & Lawrence, which connects with the Boston & Maine at its southern terminus. It seems, however, as if the Boston & Maine interest in such a line would be too small to warrant the expenditure necessary to control it, and the ambition of that company's managers is probably satisfied with their present possession of the lines from Portland to Boston and Worcester.

Should the Boston & Lowell's lease of the Boston, Concord & Montreal be set aside, it will still retain a connection with the Vermont and the northern lines by its lease of the Northern Railroad, although it would lose some of its summer business to the White Mountains, which is probably worth quite as much as the Boston-Montreal traffic.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Norfolk & Western.—Track is laid on the *Cripple Creek Extension* from Pulaski, Va., to Pierce Furnace, 23 miles.

St. Louis & Chicago.—Completed from Litchfield, Ill., north to Springfield, 45 miles.

San Antonio & Aransas Pass.—Extended from Beeville, Tex., to Papalote, 20 miles.

Tucson & Globe.—Track laid from Tucson, Ariz., northward 7 miles.

This is a total of 95 miles on 4 lines, making in all 1,955 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles.		Miles.
1886...	1,955	1881.	2,924	1876.....	1 046
1885.....	1.272	1880.....	2,525	1875..... ...	594
1884.....	1,712	1879...	1.187	1874..... ...	913
1883.....	2,761	1878.....	941	1873	1,966
1882.....	5,473	1877.....	830	1872.....	3,372

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

Foreign Technical Notes.

A Russian journal (*Engineering*), published at Kief, is publishing a translation of a large part of Professor Hadley's "Railroad Transportation, its History and its Laws."

After a good many years of preliminary discussion, the locomotive superintendents of Scotland have formed an Association in imitation of the Master Mechanics' Association here. It was at first intended that the Association should embrace all the locomotive and carriage superintendents of Great Britain, but that idea had finally to be abandoned. Mr. D. Drummond, of the Caledonian Railway, is the head of the Association, which holds its quarterly meetings in Edinburgh.

The French government has adopted a new method for disinfecting the cattle cars of the state railroads by heating them with steam to a temperature of 110 deg. Cent. (230 deg. Fahr.) A few minutes' contact with steam of this temperature is sufficient to destroy all germs of contagious diseases. The discoverer of this simple method is Dr. Redard, Physician-in-Chief on the state railroads, and for it he has been decorated with the Legion of Honor.

The Society of German Engineers has 30 branch societies, with a total of nearly 5,600 members. It will hold its 27th annual convention in Coblenz, Aug. 23 to 25 next. Among subjects for discussion at this convention are: "Steam Boiler Inspection," "Preparatory School Instruction for the Higher Scientific Callings," Experiments on the Resistance of Steam Boiler Tubes to Pressure from Without," "The Protection of Secrets in Manufacturing," "Introduction of a Metrical System of Screw Threads," "Formation of Technical Courts of Arbitration and Establishment of Technical Chambers of National Courts."

TECHNICAL.

Locomotive Building.

The Dickson Manufacturing Co. in Scranton, Pa., has just closed a contract for 15 passenger engines with 16 by 24 in. cylinders for the St. Louis, Arkansas & Texas Road, to be delivered in October next. The works are busy on 10 engines of the same class and some mogul freight engines for the Delaware & Hudson Canal Co.; 2 passenger engines with 17 by 24 in. cylinders for a Kansas road and several light engines for Florida and other roads.

The Brooks Locomotive Works in Dunkirk, N. Y., have delivered 2 mogul freight engines with 18 by 24 in. cylinders to the Cincinnati, Hamilton & Dayton road.

The Pennsylvania Railroad shops at Altoona, Pa., have received orders to build a number of new Class R engines. These are heavy Consolidation engines intended for use on the mountain grades and other heavy work.

The Car Shops.

The Boston & Albany shops at Allston, Mass., have just completed 2 new passenger cars for the road. These cars have the Norman roof, similar to that in use on the Mann boudoir cars, and are provided with the Mihan ventilator. The floors are of hard pine and maple, the interior finish of polished walnut and the headlinings are of oak in panels. The seats are upholstered in brown plush, and the windows have brocade curtains. At each end of the car is a large toilet room and a wash room. The cars will be warmed by the Baker heater. The trucks are the company's standard and are provided with the Bemis axle box.

The Sewell Safety Car Heating Co. has been organized at Portland, Me., with $2,000,000 capital stock, to make car heating apparatus. Mr. Bion Bradbury is president.

The Peninsular Car Co. in Detroit recently completed a large order for box cars for the Cincinnati, Hamilton & Dayton road and has now received another order from the same company.

Car Couplers.

The Grand Rapids & Indiana Railroad Co. has given an order to the Cowell Platform & Coupling Co. for 12 car couplers. This company is trying several patents of car couplers in actual service on its road.

Bridge Notes.

The Berlin Iron Bridge Co., in East Berlin, Conn., has just completed 3 iron highway bridges in Jewett City and 3 in Plainfield, Conn., to replace bridges destroyed by a freshet last spring.

The works of the Pennsylvania Construction Co., at Uniontown, Pa., are completed and in full operation. The company has several small orders for highway bridges in Western Pennsylvania.

The Allentown Rolling Mill Co., in Allentown, Pa., is entering into the manufacture of bridges and bridge iron. The company has recently been awarded the contract for 6 new iron bridges in Luzerne County, Pa., by the county commissioners.

Mr. J. W. Walker, at the Shiffler Bridge Works in Pittsburgh, is building two iron truss bridges for the Minnesota & Northwestern; an iron viaduct and bridge across the Pittsburgh, Fort Wayne & Chicago tracks in Allegheny, Pa., several iron highway bridges and a large lot of iron girders and roof trusses for building at Madison, Wis., St. Paul, Minn., Chicago and Pittsburgh. These works have lately completed a pair of girders of unusual size for a plate girder bridge on the Pennsylvania Railroad. They are 75 ft. long by 6 ft. 4 in. deep and weigh 15 tons each.

Iron and Steel.

The Pittsburgh Forge & Iron Co. is running full-tim in all its departments, and is filling several heavy orders for car axles.

Bellefonte Furnace, in Ironton, O., has gone into blast after a short stoppage.

The Falcon Iron & Nail Co. has leased the Russia Rolling Mill at Niles, O., for three years, with the privilege of purchase at any time during the lease.

Sarah Furnace, at Ironton, O., goes into blast this week, after being thoroughly repaired.

The Helmbacher Forge & Rolling Mill Co., in St. Louis, has its forge department busy on car axles and on heavy forgings for a sugar mill and other machinery.

Manufacturing and Business.

The Union Switch & Signal Co. in Pittsburgh has received an order for an interlocking apparatus for the yard at Holmesburg, Pa., on the Pennsylvania Railroad.

The Cincinnati Corrugating Co. in Cincinnati reports a constantly increasing demand for corrugated iron for ceiling and interior decorations of stations, public halls and other large buildings.

The Westinghouse Machine Co. in Pittsburgh has recently sold an 80 H. P. Westinghouse engine to go to Cuba, a 75 H. P. for Moscow, Russia, several others for Mexico, Rotterdam, Holland and Paris.

The Rail Market.

Steel Rails.—The market is reported steady at $34@$35 per ton at Eastern mills, with a number of new orders, chiefly for small lots. Several large orders, however, are on the market. It is stated that a heavy contract has been let for English steel rails to be delivered at New Orleans. This contract, it is understood, is for the Alabama Great Southern road, and the fact that the chief owners of the road are English, may have something to do with the placing of the order.

Rail Fastenings.—A fair demand is reported, with quotations steady at 2.40 cents per lb. for spikes in Pittsburgh; 2.75@3.10 for track-bolts and 1.65@1.80 for splice bars.

Old Rails.—The market for old iron rails is dull, with supply increasing. Quotations are nominally at $19@$22 per ton at tidewater. Old steel rails are quoted at $20@$22 per ton in Pittsburgh, with short supply.

The Kansas City Elevated Railroad.

A very important enterprise to Kansas City is that of the elevated railroad now being constructed in the West Bottoms. Work on this important road is progressing at a very rapid rate, and promises to be the fastest piece of engineering work ever accomplished in the West. Work was not commenced on the line until late in the spring, yet cars will be running inside of two months from this time. The foundations being placed in Ninth street are well nigh completed. The iron work for the superstructure is about all on the ground, and the erection will commence inside of a month. Work will be begun at Mulberry street and be carried on toward the Kaw River, and will be completed within six weeks from date. On the west side of the Kaw River the wooden trestlework is nearly all completed and track laying will be commenced within a week. The excavations in Wyandotte are all finished, and the masonry is being put in the Minnesota avenue tunnel. Everything pertaining to the track, such as rails, splice, spike and bolts, are now on the ground and distributed. This road, it is claimed, contains many improvements over the roads in New York. The object of the engineer has been to make a neat, strong and

light structure. All the stations have not as yet been located, but the following have been made known: Ninth and Mulberry, Ninth and Wyoming, Ninth and State Line, Ninth and James, Kaw River bridge. The cars, which are of the most improved pattern, are now receiving the finishing touches at Pullman, and will be shipped on order. The motors are being constructed by the Baldwin Locomotive Works, and will soon be ready for shipment. The trains will be run at about 15 miles an hour in the West Bottoms, and 20 miles an hour on the other side of the river. The line extends a distance of about 3½ miles, from the Union depot to Wyandotte.—*Kansas City (Mo.) Commercial.*

Getting Above High Water

Mr. M. S. Belknap, Superintendent of the Vicksburg, Shreveport & Pacific road, gives the Cincinnati *Times-Star* the following account of the work in progress on his road:

"We are raising the grade of 57 miles of our road between Delta and Monroe, La. The road has been overflowed so much that we have decided to raise it. We are raising it from 1 to 9 ft. and are running trains over it all the time. We have about 500 convicts employed. No free laborers would work in the swamps, not because they are unhealthy, but because it is such hot and disagreeable work."

"The overflow comes from the Mississippi River mostly. When we get this improvement made we will be high and dry. We escaped pretty well this spring. We were overflowed in only one place. The Tensas River makes a semicircle around our track. The track is perfectly straight, and the river crosses us at Dallas, makes a curve around, and recrosses us at Quebec. Last spring this river put 4 ft. of water on our track between those two places. We ran our trains through 3½ ft. of water, until one day an engine got off the track, and there was no way of getting it on again. Then I got a tug and a flatboat, that I had in waiting, and transferred our trains to the flatboat and towed them around the river until we struck the opposite station, and we carried our through trains right through all the time, and only two hours late at destination. The water this side of Quebec got to be rather deep for us, but not deep enough for the boat to run through, and I ran a lot of flat cars on the track, laid rails on them and ran my trains up to the steamboat, landing right on the top of those cars. We didn't get left on account of a little flood. But we will not have any more trouble after this.

Putting the Wires Underground.

The Standard Underground Cable Co. has just completed a contract of about 50 miles of Waring anti-induction cable for the Mackay-Bennett Ocean Cable Co. to replace the celebrated Siemens cable of London, laid about one year ago, and which has already been condemned. The new work has just been tested and far surpasses the requirements of contract specifications. The company expects another large contract from the same parties; also, a large contract for New York Fire Department, where the Waring cable has been used for upward of two years. Last fall all the circuits into the old Central Office were put underground in Waring cable, and this season all circuits into the new headquarters, Sixty-seventh street and Third avenue, are being laid in Waring underground cable.—*American Manufacturer, Pittsburgh.*

Wilson's Valve Gear.

Mr. William Wilson, Superintendent of Machinery of the Chicago & Alton Railroad, has applied a new valve gear of his invention to a locomotive on that road. Two valves are used for each cylinder, one controlling the steam and the other the exhaust, both valves being worked by one eccentric. The first engine fitted with this valve gear has run several trips very successfully, in one instance running from Mount Forrest to Chicago, 16 miles, in the centre notch, with a passenger train of nine cars.

The Wear of Steel Rails.

A paper on this subject was recently read before the (English) Institution of Civil Engineers, by Mr. Harry Footner, who thinks that sufficient information has not hitherto been collected and published to guide permanent-way engineers in determining when a rail should be removed. Mr. Footner, having found that rails made at the same time by the same maker gave very different results in working, has endeavored to investigate the cause. He found the loss on several rails to vary considerably, and not in proportion to the amount of traffic. The loss on the head is due to abrasion and corrosion combined, and on the body to corrosion only. Mr. Footner gives arguments and facts which seem to prove that the rate of corrosion on the bright surface of the rail is four or five times as rapid as on the body of the rail. The due recognition of this fact leads to some conclusions of interest and importance, not only to rail-makers, but to all who use metal unprotected by paint or lubricants. Mr. Footner mentions a steel tire, as an example, which must lose by corrosion an amount hitherto unsuspected.

Petroleum as Fuel.

One of the latest novelties introduced upon the London & Brighton Railway is the experimental use of petroleum as fuel on a locomotive. The principle, it seems, is somewhat similar to the petroleum furnace recently used with considerable effect on board H. M. S. "Caspian." The petroleum is injected by steam into the furnace, and it gives a white heat, generating steam very rapidly. The experimental engine is running a local passenger train. Careful observations are being made to test the economic and efficient properties of this means of coaling up. The experiment is not absolutely free from objections, as the petroleum gives off a pungent vapor which the ordinary steam blower has not yet conquered. It is certain, however, that with the development of the vast petroleum wells in Egypt and the adaptability of the fluid to the purposes described, some radical change in the method of generating steam in marine and locomotive boilers is not far distant.—*Railway and Tramway Express.*

A New Button for Railroad Uniforms.

The Fox changeable button, manufactured by the Specialty Button Co., of 391 Broadway, New York, provides a button for conductors' and other uniforms which can be readily changed from a uniform to a plain or civilian button, without inconvenience to the wearer or disarranging the clothing. The under part of this button is made of hard rubber of any desirable color or pattern, provided with a screw-thread on the outer rim. The uniform top, or shell part, is made of metal of the desired pattern, and is provided with an internal screw-thread adapted to screw over the lower part when the wearer desires to resume his uniform. The buttons can, of course, be made of any desired pattern for railroad or other uniforms. There is the further advantage that the metal portion can be detached and cleaned without any danger of soiling the garment. These buttons are now in use on the Manhattan Elevated lines in New York, the Staten Island Rapid Transit, the Union Ferry Co., of New York, the Metropolitan and the Highland street railroads in Boston, and on the Long Island, the Wisconsin Central and other railroads. They are also in use in the police and fire departments of several cities.

The Physical Qualities of Steel.

A curious bit of experience has been had recently at one of the leading steel mills in the United States. A quantity of material for a bridge was rejected by the inspector of buyers, much to the surprise of the producers. The manufacturers decided to make an independent investigation, which resulted in showing that the rejected material did come up to specifications. Further research followed, and developed the fact that, for a given number of hours after the material had left the rolls, its physical qualities gradually changed, reaching a period of rest only after a certain time had elapsed. So far as we know, no such observations have yet been made anywhere, and if the facts are borne out by the experience of others a good deal that is mysterious in steel may be explained.—*Bulletin of the American Iron & Steel Association.*

THE SCRAP HEAP.

Working Expenses.

"You are one of the parties who are buying up street railroads, I understand."

"Yes."

"I have a pretty big interest in a road at Louisville, and would like to sell."

"Any other stockholders feel the same way?"

"Shouldn't wonder. It's a rare chance; horses are mighty cheap down there, and——"

"Never mind about the horses; what's the price of aldermen?"—*Exchange.*

A Narrow Escape.

A brakeman on a parlor car on one of the fast trains on the West Shore Railroad, had one of the most miraculous escapes from instant death on record, Thursday afternoon, July 22, while passing through Kingston. The train he was on was running at the high rate of speed of about 40 miles an hour. The brakeman bent forward to adjust a pin and lost his balance. He fell on the track between two cars. He kept his presence of mind, stretched out flat as he could, and two coaches passed over him without doing him the least injury. With the exception of a slight scratch on one of his fingers on the left hand, inflicted when he struck the ground, he escaped unhurt.—*Port Jervis (N. Y.), Gazette, July 24.*

The Fisherman's Mistake.

On the Old Colony Railroad a venerable disciple of Izaak Walton *en route* for the Cape had been intently watching a delegation from a Salvation Army corps, and wondering what was the nature of their occupation in life. Finally he made bold to tap the leader on the shoulder, and said in a kindly tone: "Are you going fishing?" "Yes," promptly replied the peripatetic Gospel expounder, "we are fishing for souls." The old gentleman pondered deeply over this problem for a few moments, and suddenly a bright idea struck him. "Them are those English fish I've hearn so much about, ain't they?" But the only answer was an explosion of laughter from all parts of the car.—*Providence (R. I.) Journal.*

Fast Time on the Canada-Atlantic.

The following fast time was made, on July 8 last, on the Canada-Atlantic, by the Boston and New York express, between Rouses Point and Ottawa. The connections at Rouses Point were behind time, and the Canada-Atlantic train started 65 minutes late. No less than 49 minutes were made up; and the whole distance, 131.7 miles, was run in 3 hours 16 minutes, corresponding to a speed of 40.3 miles per hour, including stoppages. Crossing the St. Lawrence occupied some 25 minutes; and 11 other stoppages, including two crossing stops, are estimated to have consumed 27 minutes, leaving the running time 2 hours 24 minutes, which gives a running speed of 54.9 miles per hour. The allowance for stops seems, however, very large. It is claimed that the last 29 miles were made in 30 minutes, including two crossing stops.

A Locomotive Engineer Struck by Paralysis.

The Keyser (West Va.) *Echo* says: "On Sunday night, July 18, about 12 o'clock, Engineer George Randels was running No. 6 extra east, and was backing on the track at Deer Park to allow the passage of another train, when he was paralyzed, losing entire control over his movements. Of course he could not respond to the signal to stop, and his engine ran into the rear platform of his train, smashing up some freight cars. He was immediately taken to Deer Park Hotel, where he received every possible attention, but died at 10:15 o'clock, on Monday morning. His home was in Grafton, where he leaves a wife."

A Runaway Train.

A freight train on the Erie, the other evening, broke apart near Hinsdale while on a down grade and running at a good rate of speed. The engineer whistled down brakes and the speed of the train was checked. This caused a draw-head to give way and two or three cars broke loose which took after the engine and what cars remained attached to it. There being no brakemen on the pursuing cars, they gained speed at every jump and chased the engine down through Olean like a young cyclone. The operator at Olean telegraphed the agent at Allegany to stop a freight train going east, which was accordingly done. The runaway cars stopped between Allegany and Olean, but the engineer's hair stood erect when he contemplated his chance of meeting and passing the eastbound freight on a single track.—*Allegany (N. Y.) News.*

Fast Time.

On Tuesday last Engine 219—one of the new ones—of the Little Miami Railroad, in charge of Engineer Charley Brown, made some time that the boys are talking about, and yet they say it was not as remarkable as can be accomplished. On that day No. 219, hauling a train consisting of 11 heavily loaded cars, made the run from London to West Jefferson a distance of 10.2 miles, in exactly 11 minutes. This, too, when the time was taken from a stand. If any other road can beat this let it come to the front.—*Cincinnati Times-Star, July 23.*

A Boy's Hard Ride.

A Pittsburgh dispatch of July 23 says: "When the New York-Chicago limited reached the Union Station at 6:15 o'clock this morning a boy about 18 years old was discovered lying between the truck and the bottom of a sleeping car. He had traveled this way from Fort Wayne, a distance of 320 miles. He gave his name as P. A. Schell, of Washington, and told the following story:

"'For eight months I have been working at Bass' foundry, in Fort Wayne, as a moulder. Yesterday a dispatch informed me that my mother is seriously ill. I had no money, every cent having gone for board, so that there was nothing left but to steal a ride. I went to the station last evening at 9 o'clock, and when the bell rang for the train to start I jumped on the front truck of the second car of the limited, and in a second we were off. I sat on the brake beam, with my legs between the frame. I kept my arms on top of the frame to steady myself, and my feet were supported by the brake rod. Every time they shut down brakes to stop I crawled over the top of the frame into the middle of the trucks and held on to the cross rods. Once my feet slipped and dragged on the ground. I then thought I was gone, but I held on like grim death and managed to get my legs up again on the brake rod. At Crestline and Alliance the train stopped to change engines and for an inspection of the trucks. When the inspectors came to the truck where I was I rolled over against the wheel on the opposite side and escaped detection. It was hard riding, I can tell you, but still I would rather travel in that way than on the bumper of a freight train.'

"A purse was made up for the boy, the railroad officials furnished him with a half-fare ticket, and he started for his home on an afternoon train."

In the Station.

A lady and her son who reside in Commonwealth avenue were recently seated in a railroad station, when their attention was drawn to a woman who, as soon as she entered, placed herself in front of the mirror, and, with the apparent freedom of her own room, adjusted her dress, untied and retied her bonnet, tightened her shoe lacings, shook and arranged her dolman, pushed to and fro the bouffant part of her skirt, at which point the lady said to her son, *sotto voce:* "Did you ever see such prinking?" In a few moments the woman alluded to stepped in front of the lady, looked her full in the face, and asked: "And is it any of your business?" To which the lady replied slowly, without the slightest change of expression: "Not the slightest."—*Boston Courier.*

Attempt at Train Wrecking.

A very narrow escape from disaster occured on the Shawmut Branch of the Old Colony Railroad about 11 o'clock last night. An inward train was about half-way between Shawmut and Field's Corner, when the locomotive came in contact with some obstruction, and the train was stopped. Investigation showed that a large rock had been placed inside of the outside rail, and it was necessary to pry out the bowlder from underneath the pilot. It would be difficult to find a better spot for such a fiendish piece of work, for the track curves sharply and the roadbed is on an embankment 20 feet high. There were about 25 passengers on the train, principally women.—*Boston Herald, July 23.*

Caring for Employes.

Mr. W. R. Baker, General Superintendent of the Manitoba & Northwestern Railway, recently issued the following circular, addressed to all employés of the road:

"The undersigned, believing it will tend to the benefit and amusement of the employés at headquarters, proposes to establish a reading room in the General Officers' building at Portage la Prairie, in which will be found papers and periodicals, and to which, eventually, it is hoped, may be added a library.

"A committee, consisting of Messrs. G. H. Webster, J. H. Kingwell, R. H Gilmour and J. G. Henry, is hereby formed and directed to prepare a scheme for the establishment and management of this reading room and to report to the undersigned as soon as possible."

In order to promote friendly feeling, invitations were recently issued to all employés of the road to join in a basket picnic at McArthur's Landing on July 24, the company furnishing transportation and bearing all incidental expenses, employés only furnishing their own eatables. Each employé who could possibly be spared from duty was invited to come, bringing his family or, if single, a lady friend. The entertainments provided at the picnic grounds were music, dancing, boating, games, etc.

This was the first occasion of the kind, but it is expected that the picnic will become a regular yearly event.

A Financial Contrast.

After the meeting at which the Cincinnati, Indianapolis, St. Louis & Chicago stockholders approved the plan for refunding the bonded debt at 4 per cent., President Ingalls, in speaking of the refunding measure and the "Big Four" in general, to-day said: "We are prosperous and at peace with all the world. The road never was making as much money as it is now. Every dollar of the first million of the new bonds—all we could issue until all of the old bonds are returned—has been sold, and the buyers are crying for more. This meeting to-day reminds me of a meeting held by the directors 13 years ago. We issued a 10 per cent. mortgage bond and quarreled with each other because nobody was willing to take his share of the bonds. Now the same persons can't get enough of our bonds bearing only 4 per cent. When the new bonds are all out we will have saved $240,000 per annum in fixed charges."—*Indianapolis News, July 26.*

His Coat Tails Suffered.

There was a funny scene at the depot yesterday that, spite of its amusing features, lacked only a trifle of being a tragedy. The 12:15 train south was pulling out, and on the rear platform of the last car stood a man who was bidding farewell to one on the depot platform. The pair kept shaking hands, the man on the platform walking along, till he ran against a truck he had not seen and fell between the platform and the tracks. His coat tails and his legs were across the rails and in a moment both would have been taken off by the pusher behind the train. Fortunately the train was going slowly and the brakeman managed to set the brake so hard as to stop the car after the man's coat tails had been cut off by the wheel of the pusher and before it had reached his legs. He scrambled up and ran off before his name could be learned.—*Hartford (Conn.) Courant, July 28.*

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Nashville, Chattanooga & St. Louis, annual meeting, in Nashville, Tenn., Sept. 15. Transfer books closed June 16.

Northern Pacific, annual meeting, at the office in New York, Sept. 16. Transfer books close Aug. 2.

St. Paul, Minneapolis & Manitoba, annual meeting, at the office in St. Paul, Minn., Aug. 19. Transfer books close July 21.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cincinnati, Hamilton & Dayton, 2 per cent., quarterly, payable Aug. 10. This company increases its dividend from 1½ to 2 per cent.

New York & New England, 3½ per cent., on the preferred stock, payable Aug. 5, to stockholders of record on July 31. This is the first dividend on the new stock.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *Master Car & Locomotive Painters' Association* will

hold its annual convention in Chicago, beginning on Wednesday, Sept. 8.

The General Time Convention will hold its fall meeting in New York, on Wednesday, Oct. 18.

The *Western Society of Engineers* holds regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

General Baggage Agents' Association.

The General Baggage Agents' Association held its semi-annual meeting at Niagara Falls, July 21, with a large number of members present. The meeting continued for two days, but was chiefly devoted to the transaction of routine business, nothing of very general interest having taken place.

Transportation in Congress.

In the House on the 22d:

The Judiciary Committee reported back the resolution introduced on June 14 last, by Mr. Cobb, calling upon the Attorney-General for information as to what action had been taken by the government looking to the protection of the United States in connection with the various land grant railroad companies, under the joint resolution of April 10, 1869, and section 4 of the Legislative Appropriation bill of 1873. The committee report that a letter from the Attorney-General seems to contain the information desired, but, regarding the resolution as a proper one, its passage is recommended. The Attorney-General in his letter states that no action has been taken under the joint resolution, and that, in accordance with the provisions of the appropriation bill, a bill in equity was filed by the Attorney-General in 1873, in the Connecticut district, the history of which may be found in the court reports.

A subcommittee of the House Judiciary Committee, consisting of Messrs. Oates, Bennett and Hepburn, has been instructed by the full committee to report to the House a substitute for the Henley resolution directing the Judiciary Committee to investigate the alleged illegal issue of bonds by the Union Pacific Railway Company. The substitute directs a subcommittee to sit during the recess of Congress, to send for persons and papers, and to make a thorough investigation of all the allegations and charges set forth in the resolution.

ELECTIONS AND APPOINTMENTS.

Atlanta & West Point.—At the annual meeting in Atlanta, Ga., July 23, the following directors were chosen: W. B. Berry, John S. Bigby, J. A. Davis, L. P. Grant, J. W. Green, W. G. Raoul, D. N. Speer. The board re-elected L. P. Grant, President; Cecil Gabbett, General Manager; H. M. Abbett, Secretary and Treasurer; Charles H. Cromwell, General Freight and Passenger Agent.

Bellaire, Zanesville & Cincinnati.—Mr. I. H. Burgoon, Receiver and General Manager, announces the following appointments: "W. T. Morris, having resigned the office of Superintendent of this railway, to take effect Aug. 1, 1886, the office of Superintendent is abolished from and after that date. All duties pertaining to that office will be performed by the Receiver. J. M. Miller is appointed Auditor and Acting General Freight and Passenger Agent. He will have charge of all matters pertaining to these departments. Jas. K. Geddes is appointed Chief Engineer and Roadmaster. He will have charge of the roadway, bridges, station buildings and water supply. J. B. Rhodes is appointed Trainmaster, and will have charge of the running of all trains, and the distribution of cars. In addition to this, he is appointed Superintendent of Telegraph, to whom all reports must be made. J. W. Gregg is appointed Master Mechanic, and will have charge of all the equipment and machinery."

In pursuance of an order of the Court, James Irvine is appointed General Counsel for the Receiver.

Cairo, Vincennes & Chicago.—The following circular from General Manager Samuel P. Wheeler is dated Cairo, Ill., July 12: "F. W. Stapf has this day been appointed Master Mechanic, vice A. N. Van Tuyl, deceased."

Cleveland & Marietta.—The following have been elected directors of this reorganized company: Morris K. Jesup, John W. Ellis, A. J. Warner, A. T. Wikoff, George K. Nash. Mr. A. T. Wikoff has been elected President. The general offices will remain at Cambridge, Ohio.

Columbia & Rensselaer.—The following have been elected officers of this recently incorporated New York company: President C. H. Stott; Vice-President, Charles Wild; Secretary, Albert Hoystradt; Treasurer, C. H. Stott, Jr.

Colusa.—At the annual meeting in Colusa, Cal., July 6, the following directors were elected: W. P. Harrington, G. W. Jones, W. D. Dean, James W. Goad, E. A. Harrington. The board elected W. P. Harrington President; C. M. Ballantine, Secretary; the Colusa County Bank, Treasurer.

Denver & Rio Grande.—A corrected list of the directors of this company as reorganized is as follows: George Coppell, Wm. S. Jackson, Robert B. Minturn, John Stardiger, Adolph Engler, John Lowber Welsh, R. T. Wilson, David H. Moffat, J. H. Adrian Tromp.

The officers chosen are as follows: Chairman of the Board, George Coppell; President, Wm. S. Jackson; Vice-President, Robert B. Minturn. The board has adopted an organization similar to that of the New York Central and a few other companies, in which the Chairman is the presiding officer of the board, while the President is the chief executive officer in immediate charge of the management of the road.

The Executive Committee is as follows: George Coppell, Chairman, J. Lowber Welsh, R. T. Wilson and Robert B. Minturn.

Gulf & Pacific.—The officers of this new company are: President, David Ochs; Vice-President, M. Henderson; Secretary and Treasurer, Maurice Maas. Office in Dallas, Texas.

Illinois Central.—The following order from General Superintendent C. A. Beck is dated Chicago, July 12: "Mr. C. M. Sheafe having resigned to accept other service, Mr. J. G. Mann, Division Superintendent of the Mississippi Division, is promoted to Superintendent of the Southern Lines. Mr. H. W. Clarke, Assistant Division Superintendent, is promoted to Division Superintendent of the Mississippi Division, in place of Mr. J. G. Mann. The appointments will take effect Aug. 1 next."

Jamestown Short Line.—The officers of this new company are: President, John Cadwell, Jamestown, N. Y.; Vice-President, Erie L. Hall, Jamestown, N. Y.; Secretary and Treasurer, Eugene F. Fay, Boston.

Kansas City, Fort Scott & Gulf.—Mr. H. H. Moies is appointed Northern Passenger Agent of this company, with office at Cedar Rapids, Ia., vice Mr. W. A. Dennis, transferred to other service.

Mineral Range.—At the annual meeting in Hancock, Mich., July 14, the following directors were chosen: George Stayner, Henry S. Ives, Christopher Meyer, Daniel D. Latham, E. D. Avery, Charles Phillips, Hon. J. A. Hubbell, J. H. Chandler, Charles A. Wright, Peter Ruppe, Jacob Baer. The officers of the company are as follows: President, George H. Stayner; Vice-President, Secretary and Treasurer, Henry S. Ives; General Manager, Charles A. Wright; Assistant Secretary and Treasurer, Henry S. Ogden, New York.

Missouri Pacific.—Mr. M. P. Walsh, Jr., has been appointed Commercial Agent, with office at Cairo, Ill. Mr. Walsh will have immediate supervision over freight traffic at Cairo and business interchanged with connecting lines, the Cairo and Belmont branches, and the territory from Poplar Bluff to Bismarck, inclusive, on the main line of the St. Louis, Iron Mountain & Southern Railway.

Montana Union.—The directors of this new company are: C. F. Adams, Jr., F. L. Ames, S. R. Callaway, Robert Harris, B. P. Cheney, J. Lewis Harris and N. J. T. Dana. Messrs. Adams, Ames and Callaway represent the Union Pacific, Mr. Cheney and the Messrs. Harris the Northern Pacific, while Mr. Dana is associated with neither company, and will hold the balance of power.

Mr. J. E. Dawson is appointed General Superintendent, with office at Butte, Mont. He was recently on the Grand Trunk road.

New York, Lake Erie & Western.—General Passenger Agent J. N. Abbott has given notice of the following appointment of division passenger agents: For the First District, C. V. V. Ward, 187 West street, New York; Eastern Division and branches, Delaware Division, New York & Greenwood Lake, Nortnern Railroad of New Jersey. Second District, Howard J. Ball, Elmira, Susquehanna Division, Tioga, Railroad; Rochester Division, Corning to Bath, Jefferson Branch. Third District, W. C. Rinearson, Buffalo, Buffalo Division, Niagara Falls Branch and adjoining territory, including narrow-gauge connections. On the New York, Pennsylvania & Ohio, T. R. Garfield, of Jamestown, is the Division Passenger Agent of the Fifth District of the system, and has charge of the eastern section of that road between Salamanca and Greenville. W. W. Dunnovant, Warren, O., has charge of the Sixth District, comprising the central section from Greenville to Springfield, O.; D. E. Holmes, Cincinnati, has the Seventh District, which comprises the territory from Springfield to Cincinnati and the Southwest.

New York & Sea Beach.—A recent order from General Manager Lawrence announces that Mr. O. R. Whitney, recently Master Mechanic, has been appointed General Superintendent of this road and its branches, the appointment to take effect from July 10. Mr. Whitney was formerly connected with the Lake Shore & Michigan Southern, and subsequently with the West Shore road, and has had extensive experience in railroad business.

Pennsylvania Company.—The following circular from Superintendent Law, of the Western Division, is dated Fort Wayne, Ind., July 20: "The title of the officer (Mr. Thomas Jackson) at the head of the Maintenance of Way Department, on the Western Division, will, commencing Aug. 1, 1886, be Engineer Maintenance of Way, instead of Road Master, as now."

Rochester & Ontario Belt.—Mr. H. M. Britton has been appointed Receiver of this road in place of George E. Merchant, resigned. Mr. Britton is General Manager of the Rome, Watertown & Ogdensburg Co., which has recently secured control of this road.

Rome.—At the annual meeting in Rome, Ga., July 21, Eben Hilyer was re-elected President; James A. Smith, General Freight and Passenger Agent; H. A. Patillo, Bookkeeper; O. W. Harbin, Master Mechanic. The old board of trustees was re-elected.

St. Joseph & Grand Island.—At the annual meeting in Elwood, Kan., July 21, the following directors were chosen: John P. Usher, Lawrence, Kan.; H. P. Dillon, A. L. Williams, Topeka, Kan; Charles Francis Adams, Jr., Frederick L. Ames, Oliver Ames, Elisha Atkins, Boston; Elias Aisel, E. C. Benedict, James H. Benedict, Sidney Dillon, Francis K. Pendleton, W. Strauss, New York.

Topeka & Lincoln.—The directors of this new company are: John Doniphan, Daniel McCool, Frank Milligan, Charles F. Smith, St. Joseph, Mo.; John A. Gilchrist, James Taylor, Abijah Wells, Seneca, Kansas.

Westfield & Chautauqua.—The officers of this company are: President, R. G. Wright, Westfield, N. Y.; Vice-President, E. A. Skinner, Westfield, N. Y.; Secretary and Treasurer, Eugene F. Fay, Boston.

Wisconsin Central.—Mr. F. N. Finney, General Manager, announces the following new appointments preparatory to the opening of the company's through Chicago & St. Paul line: Assistant General Manager, A. A. Allen; Superintendent Chicago Division, F. A. Merrill; Assistant Superintendent Chicago Division, N. J. Finney; Superintendent parlor-car, sleeper and dining-car service, Sam H. Brown; City Passenger and Ticket Agent, Chicago, H. C. Fuller; Commercial Agent, Chicago, J. B. Cavanaugh; Local Freight Agent, Chicago, W. B. Sells; Depot Agent, Chicago, C. D. Duncan; Eastern Passenger Agent, located at New York, H. E. Tupper; W. F. Bemis, with Eastern Freight Department at New York; Traveling Passenger Agent, headquarters at Milwaukee, H. N. Waldo.

PERSONAL.

—Mr. W. T. Morris has resigned his position as Superintendent of the Bellaire, Zanesville & Cincinnati road.

—Mr. C. M. Sheafe has resigned his position as Superintendent of the Southern Lines of the Illinois Central road, to accept other service.

—Mr. J. E. Dawson, for a long time Assistant Superintendent of the Great Western Division of the Grand Trunk Railway, has resigned that position to accept the appointment of General Superintendent of the Montana Union road. His office will be at Butte, Montana.

—Mr. James W. McCulloh has resigned his position as Secretary of the New Aqueduct Commission in New York City. Mr. McCulloh was formerly Receiver of the New Jersey Midland Railroad, and is a civil engineer by profession, his training well fitting him for his work in connection with the aqueduct. He has been an active, independent and upright official, and his retirement is said to be caused by pressure from the politicians, who opposed his appointment in the first place.

—Mr. George L. Carman, late Commissioner of the Northwestern Traffic Association, has been offered the position of Commissioner of the Missouri & Kansas pool. This pool is composed of the St. Louis & San Francisco, the Southern Kansas, the Atchison, Topeka & Santa Fe, the Fort Scott & Wichita, the Missouri Pacific and the St Louis, Kansas City & Southern. It covers about 500 stations in Central and Southern Kansas, including Emporia and Wichita. At present only the cattle business is pooled, but it is the intention to pool all dead freight traffic. Mr. Carman has not yet decided whether to accept the new position or not, as another position has also been offered to him and he is considering which place he had better take. Mr. Carman is well posted on traffic affairs from that territory.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Six months to June 30:				
Balt. & Potomac.	$629,914	$655,542	D. $25,628	3.9
Net earnings.	234,732	251,170	D. 16,438	6.5
B., N. Y. & Phila.	1,200,636	1,083,441	I. 117,195	10.8
Net earnings	195,682	236,887	D. 41,205	17.4
Mexican National	840,842	804,041	I. 36,801	4.5
Nash., C. & St. L.	1,080,809	1,027,218	I. 53,591	5.2
Net earnings.	417,193	412,079	I. 5,114	1.2
N. Y., L. E. & W.	8,523,772	7,094,153	I. 1,429,619	20.1
Net earnings	2,800,885	1,886,707	I. 914,188	48.1
N. Y., P. & Ohio.	2,843,038	2,299,990	I. 543,048	23.6
Net earnings	911,301	519,728	I. 391,573	75 3
N. Y. Sus. & W.	503,788	496,116	I. 7,672	1.5
Norfolk & West.	1,449,388	1,237,030	I. 212,358	17.0
Net earnings.	566,096	445,693	I. 120 403	27.0
Northern Cen.	2,582,401	2,597,772	D. 15,371	0.6
Net earnings	899,380	1,043,175	D. 143,795	13.8
Pennsylvania	23,250,171	21,319,600	I. 1,930,581	9.1
Net earnings	7,669,423	6,519,658	I. 1,149,765	17.6
Phila. & Reading.	13,420,718	12,710,262	I. 710,516	5.6
Net earnings	5,099,496	4,719,157	I. 380,339	8.1
St. Jo. & Gd. I.	546,983	497,518	I. 49,465	9.0
Net earnings	249,745	116,690	I. 133,055	113.8
Five months to May 31:				
Dayton & Iron.	$89,549	.....	.....	....
Net earnings	*5,948	.....	.....	....
Maine Central.	1,098,157	$1,045,842	I. $52,315	5.0
Net earnings	367,833	352,773	I. 15,060	4.3
Month of May:				
Dayton & Ironton	$14,584	$13,393	D. $1,809	13.8
Net earnings	*7,586	1,305	D. 8,981	...
Maine Central.	238,146	222,338	I. 15,808	7.1
Net earnings	88,392	83,198	I. 5,194	6.2
Month of June:				
Balt. & Potomac.	$108,450	$103,957	I. $4,493	4.3
Net earnings	42,654	35,380	I. 7,274	20.7
Buff., N. Y. & P.	226,560	211,557	I. 15,003	7.1
Net earnings	45,532	67,127	D. 21,595	32.2
Mexican National.	139,252	136,599	I. 2,653	1.9
Miss. & Tenn.	22,948	31,552	D. 8,604	27.2
Nash., C. & St. L.	178,139	147,700	I. 30,439	20 6
Net earnings	75,205	61,903	I. 13,302	21.8
N. Y., L. E. & W.	1,536,808	1,202,186	I. 334,622	17.9
Net earnings	550,063	362,760	I. 187 303	51.6
N. Y., P. & Ohio.	515,731	367,274	I. 148,457	40.4
Net earnings	169,551	70,294	I. 99,257	141.2
N. Y., Sus. & W.	84,057	90,222	D. 6,165	6 8
Norfolk & West.	228,126	191,767	I. 36,359	19.0
Net earnings	85,404	57,054	I. 28,350	49.9
Northern Central.	432,536	416,219	I. 16,317	3.9
Net earnings	95,468	135,980	D. 40,512	29.8
Pennsylvania	4,336,102	3,735,639	I. 600,463	16.0
Net earnings	1,351,126	909,437	I. 441,689	48.6
Phila. & Reading.	2,532,364	2,428,293	I. 104,071	4.3
Net earnings	1,049,939	943,456	I. 106,483	11 4
St. Jo. & Gd. I.	88,077	68,231	I. 19,846	29.2
Net earnings	34,359	*636	I. 34,995	....
Third week in July:				
Buff., R. & Pitts.	$25,445	$24,141	I. $1,304	5.4
Canadian Pacific.	231,000	209,000	I. 22,000	10 5
Chi. & Alton.	185,529	172,889	I. 12,6 0	7.3
Chi. & East. Ill.	39,436	28,631	I. 10,805	37.2
Chi., Mil. & St. P.	455,000	422,878	I. 32,122	7.6
Chi. & Nor'west.	476,200	472,900	I. 3,300	0.7
C., St. P., M. & O.	109,900	102,400	I. 7,500	7.3
C., I., St. L. & C.	48,604	40,000	I. 8,604	21.5
Den. & R. G.	130,882	124,568	I. 6,314	5.0
Illinois Central.	190,000	181,675	I. 8,325	4 6
Iowa lines.	30,100	34,309	D. 4,209	12.3
Louisv. & Nash.	285,145	236,420	I. 48,725	20.6
Mil. & Northern.	11,915	10 911	I. 1,004	9.2
Oreg. R. & N.	86,478	78,879	I. 7,599	9.6
St. L. & San F.	83 700	74,400	I. 9,300	12.5
Wab., St. L. & P.	236,000	195,000	I. 41,000	21.0

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Coal.

Coal tonnages for the week ending July 17 are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Anthracite	670,660	746,861	D. 76,201	10.2
Eastern bituminous	260,942	230,810	I. 30,132	13.0
Coke	76,?86	50,708	I. 25,578	50.5

The anthracite companies have agreed not to change list prices, but to make an effort to increase actual prices so that they may be brought up to a point somewhere near the list prices, which have been entirely nominal for some time past. The August output, as noted last week, is fixed at 2,500,000 tons.

Pennsylvania Railroad coal tonnage for the week ending July 24 was:

	Coal.	Coke.	Total.	1885.
Line of road	158,110	75,048	233,158	183,450
From other lines	91,011	919	91,930	69,487
Total	249,121	75,967	325,088	252,937
Year to July 24	6,396,141	1,859,186	8,255,327	7,427,311

Increase for the week, 72,151 tons, or 28.5 per cent.; increase for the year, 828,016 tons, or 11.2 per cent.

Cumberland coal shipments for the week ending July 24 were 75,579 tons. Total to July 24 this year, 1,036,610; last year, 1,490,417; decrease, 453,807 tons, or 30.5 per cent.

Petroleum.

The production, shipments, etc., of the Pennsylvania and New York oil fields for June are given by *Stowell's Petroleum Reporter* as follows, in barrels of 42 gallons:

	1886.	1885.	Inc. or Dec.	P.c.
Production	2,335,380	1,767,210	I. 568,160	32.2
Shipments	2,117,487	2,034,025	I. 83,462	4 1
Stock, June 30	24,187,377	25,872,259	D. 1,684,880	4.7
Producing wells	24,797	22,384	I. 2,413	10.7

The production is the largest recorded for any month since September, 1882. Of the total the Alleghany District in New York furnished 6.1 per cent.; the Bradford District in Pennsylvania, 25.9; the Warren District, 16.9; the Lower District, 38.4, and the Washington District (new), 12.7 per cent.

Shipments were less than production, for the first month in a long time.

The stock on hand was increased 217,893 barrels, that being the excess of production over shipments for the month.

During June there were 365 new wells completed and 53 dry holes developed. At the close of the month there were 403 new wells under the drill, and preparations in progress for drilling 340 others.

Cotton.

Cotton movement for the week ending July 23 is reported as follows, in bales:

	1886.	1885.	Inc. or Dec.	P.c.
Interior markets:				
Receipts	7,323	2,687	I. 4,636	172.0
Shipments	12,152	3,978	I. 8,174	205.0
Stock, July 23	64,810	22,300	I. 42,510	190.6
Seaports:				
Receipts	6,744	2,194	I. 4,550	207.0
Exports	39,459	8,058	I. 31,401	390.1
Stock, July 23	256,296	223,132	I. 23,164	10.4

The total shipments from plantations for the crop year to July 23 are estimated at 6,455,130 bales, against 5,592,976

last year, 5,643,063 in 1883-84 and 6,934,332 bales in 1882-83.

Commissions on Passenger Business.

The Northwestern Passenger Association has issued a circular giving notice that from Aug. 1 the maximum rate of commissions paid by any line in the association on tickets of any class will be $1. This is the entire amount which can be paid on any one ticket, without regard whether this commission is paid the ticket agent or divided between him and any other person. No payments of any kind can be made in the way of sharing rents or payments of salaries or commissions to any outside person. The lines included in this agreement are the Burlington, the Northwestern, the St. Paul, the Rock Island, the Omaha, the Central Iowa, the Minneapolis & St. Louis, the Illinois Central, the Wisconsin Central and the Wabash.

St. Louis East-Bound Pool.

A dispatch of July 22 says: "The old balances of the St. Louis east-bound pool, which have been the source of much uneasiness and dissatisfaction among the east-bound roads from St. Louis for more than a year, and which until now prevented the perfection of the new east-bound agreement from that point, have at last been satisfactorily settled. A short time ago the matter was referred to Commissioner Blanchard and Joint Agent Depew for arbitration. These gentlemen have at last adjudicated the matter, and a few days ago their award was duly announced to the various roads. According to their decision the Alton gets $11,497 the Wabash $6,618, and the Ohio & Mississippi $3,798. The Indianapolis & St. Louis has to pay $1,850, and the Vandalia $20,063. The roads have accepted the award, and the new east-bound pool from St. Louis has also been signed."

Lumber from Canada by Lake.

A Detroit dispatch of July 23 says: "The departure of the great log boat 'Michigan,' which left Alpena in tow of a powerful tug bound for French River, Georgian Bay, for a load of logs for Tawas parties, yesterday, was witnessed by a large crowd, so much interest has been taken in the experiment, on which large interests depend.

"Within the past two years Michigan lumbermen have turned their attention to Canada, and extensive purchases of pine lands have been made near the shores of Lake Huron and along the large streams emptying into that inland sea. To move their mills to that side of the lake for the purpose of cutting up the pine involves great expense. Then, too, they must encounter the tariff on imported lumber on seeking an American market. To somehow get the logs to this side would solve the difficulty, as there is no tariff on these. Transportation by rafts has been attempted in a few instances, but the risks are very great, as Lake Huron is a decidedly stormy body of water, and the breaking up and scattering of a single raft would sadly trench upon the profits of a season's business. Hence the experiment of the log boat, which is intended to bear the same relation to water transportation that the log train does to the railroad. If it can be managed successfully and not too expensively it promises to solve a very important problem in connection with the lumber business of Michigan for the next 20 years.

"This pioneer boat, named after the state, is 294 ft. over all, 42 ft. beam, with 16 ft. depth of hold, and has a tonnage of 1,227. She has one boiler 15 ft. long, 7½ ft. in diameter, and two engines. One engine has a 16 by 12 in. cylinder. The other engine has two cylinders, 14 by 12 in. each, and is connected with two 18-in. pumps, and also with an apparatus for hoisting anchors, of which she carries two, one weighing 1,600 and the other 3,000 lbs. The chain of the large anchor weighs 20 lbs. to the link, and is made of 1¾-in. wire. The apparatus for hoisting logs on board is a slip that extends on an incline to the water, in which an endless chain runs, and on which are hooks which carry the logs up the slip, which is jointed at the rail and extends across the deck. Here men with cant hooks will receive and roll the logs off on to the skids, where they are held until wanted in the hold, they being there dropped into 5 ft. of water. The water comes into the hold through a 10-in. aperture in three hours, and the two 18-in. pumps empty the hold again in four hours. There are two of the slips. The logs are hoisted out of the hold at the after hatches (of which there are seven) by two upright slides with arms, upon which the log rests. When the log gets on deck it rolls on to a set of rollers that carry it overboard. It is claimed that the craft can be loaded in less than 20 hours. She has a full set of canvas on four spars, 10 men for a crew, and will carry about 700,000 ft. of logs. The question of expense would seem to be the only one to be settled by experiment. It is probable that no special interference would be encountered from boisterous weather, and there seems no reason to doubt that as in the ore and grain carrying trade from three to six of these immense barges could be loaded and towed across Lake Huron by a single powerful tug."

Central Traffic Association.

A meeting of the Central Traffic Association, Passenger Committee, will be held at the International Hotel, Niagara Falls, on Tuesday, Aug. 3, at which the special order of business shall be as follows:

1. Consideration of Special Rates.
2. Arbitration of differences of all matters pertaining to the Association.
3. Consideration of basis for percentages.
4. Any special business of importance which may be properly brought up, it being understood by those who vote for this resolution that they will remain until the business of the meeting is fully and completely accomplished.

The Arbitrator of the Passenger Department will be present on Wednesday, Aug. 4, for the purpose of becoming as thoroughly informed as possible upon the questions which are likely to be brought before him for arbitration.

RAILROAD LAW.

A Railroad Company is Not a Merchant.

The Illinois Railroad & Warehouse Commission has decided in the case of Alexander Helm against the Illinois, Indiana & Iowa Railroad that a railroad company has no right to sell coal. The Commission finds that the company has no right to buy and sell in the public market, and that its action in this case is, in fact, a discrimination and violation of the statute. It directs the Attorney-General to bring suit against the company to collect the penalty prescribed by law.

Employe's Liability for Negligence.

In Chicago, July 21, the Appellate Court rendered a decision in the case of the Chicago, Burlington & Quincy Railroad Co. against Charles S. Bartlett, affirming the decision of the lower court.

Bartlett was Paymaster for the railroad company, and on March 1, 1884, a package of money containing $26,850 was stolen from his safe in the office, in the company's building, at the corner of Adams and Franklin streets, Chicago. No clew to the robber was ever discovered, but the company dismissed Bartlett from its employ for alleged negligence, claiming that he had left his office to go to lunch and had not closed the safe with the combination, although he insisted that he had left the safe locked. The company brought suit against him and his bondsmen. The jury in the Superior Court acquitted him, and the company took an appeal, which has now been decided.

OLD AND NEW ROADS.

Americus, Preston & Lumpkin.—Work is progressing steadily on the extension from Lumpkin, Ga., westward to the Chattahoochee River. It is now proposed to extend the road eastward also, from Americus to Abbeville, on the Oconee River. Subscriptions to the stock are asked for, and work will be begun as soon as a sufficient amount of stock has been taken.

Atchison, Topeka & Santa Fe.—It will be remembered that Mr. C. H. Venner, a stockholder, recently began suit in the United States Circuit Court in Kansas, to restrain this company from issuing new stock and otherwise completing its agreement for the purchase of the Gulf, Colorado & Santa Fe road. Mr. Venner has now begun an auxiliary suit in the United States Circuit Court in New York to restrain the Farmers' Loan & Trust Co., trustee, from issuing any of the stock intrusted to it for the purpose of exchange for the Gulf, Colorado & Santa Fe stock.

Baltimore & Ohio.—Work on the new line at Fairmount in Philadelphia is progressing steadily. On the tunnelway at Twenty-fifth street 200 laborers are engaged in excavation. The tunnel will be nearly 1,200 ft. in length, and will extend from the intersection of Callowhill and Twenty-fifth streets to Fairmount avenue. The track will be at an average depth of 22 ft. from the street surface, and the sides of the tunnel, which are to be perpendicular instead of arched, will be lined with blocks of cemented rubble masonry. For 475 ft. at the southern end the arching will be constructed of iron girders and riveted steel plates, upon which will be formed a surface layer of asphalt. The next 700 ft., owing to higher ground, will be of brickwork, and this will be succeeded by ironwork, as in the first subsection. The stonework of the section is being done by Drake & Stratton, of this city, and the ironwork by Frederick Smyth, of Baltimore. The work of construction of the tunnel will occupy over six months longer.

Boston & Maine.—The report that this company was negotiating for the controlling interest in the Providence & Worcester Co. is denied by authority.

In Boston this week the stock of this company sold up to 207½, which is said to be the highest price ever reached by the stock of any New England road, with the exception of the Concord Railroad. The stock of that company sold recently at 215, but its price is maintained not only by its steady 10 per cent. dividends, but by the peculiar position which it occupies and the desirability of securing control. The Boston & Maine is now regarded as a steady 9 per cent. stock, and is very largely held for investment, comparatively little of it coming upon the market.

At 207½ Boston & Maine stock will pay the buyer only a little over 4¼ per cent.

Buffalo, New York & Philadelphia.—The statement for June and the nine months of the fiscal year from Oct. 1 to June 30 is as follows:

	June.		Nine months.	
	1886.	1885.	1885-6.	1884-5.
Earnings	$226,560	$211,557	$1,856,846	$1,690,372
Expenses	181,028	144,430	1,483,462	1,281,122
Net earnings	$45,532	$67,127	$373,384	$409,250

For the nine months the gross earnings increased $166,474, or 9.8 per cent., and the expenses $202,340, or 15.8 per cent., the result being a decrease in net earnings of $35,866, or 8.8 per cent. The expenses this year include about $170,000 for renewals and improvements.

Central, of New Jersey.—It is now stated positively that a committee of the directors of this company is considering a traffic contract providing for the use of the company's tracks between Bound Brook and Jersey City, and of its terminal facilities by the Baltimore & Ohio Co. The terms of the contract have not been made public, and will not be published until the board has passed on them.

Central Pacific.—The Redding (Cal.) *News* says of the work on the extension of the Oregon Division: "Eleven surveys were run to get out of the chasm of the Sacramento before a practical route could be settled upon. The new route runs on the west side of the gorge, five miles north of Upper Soda Springs. Then it crosses to the east side and back down nearly three miles, emerging from the cañon, a little south of Black Cañon; then it describes about three-fourths of a circle, coming back on to the bluff that overhangs the river; thence north to the Big Cañon, where Mr. Hood will have to build a monster high bridge or be compelled to suspend his road from a balloon. After the Big Cañon is crossed the work becomes easier until the Siskiyou Mountains are reached.

"The company is hiring all the men it can get, and has increased the pay in all departments of construction.

"There seems to be a desire to get through the snow belt that reaches from Upper Soda Spring to Edgewood, before the winter sets in."

Chicago & Atlantic.—It is again reported that before the troubles of this company are settled there will be a foreclosure of mortgage and a reorganization of the company, and its officers do not deny that such a proceeding is contemplated.

Chicago & Eastern Illinois.—A statement published in Boston says that, estimating the expenses for June, the net earnings of this road for the year ending June 30 will be about $800,000, which will leave a surplus of $203,000 over all interest and rental. This amount will be equal to about 6¾ per cent. on the stock. The company paid a dividend of 2½ per cent. in March last, being the first it has ever declared.

Chicago, Milwaukee & St. Paul.—The plan for this company's bridge over the Missouri River at Randolph on the new extension to Kansas City are completed and will be submitted to the Secretary of War for approval, as required by law. Work will be begun on the bridge as soon as the plan has been received. According to the design prepared by the company the bridge will consist of three spans, each 400 ft. in length, and resting upon four piers, which in turn rest upon a solid rock foundation. The foundation of the pier at the south end of the bridge is 79 ft. 10 in. below the surface of the ground, that depth of mud and earth having to be passed through before rock is reached. The channel of the river hugs the Clay County side, and the greatest depth of water reached by the soundings made during high water was 40 ft. It has not yet been determined whether the bridge will be built of a single track road, but the present plans were drawn for the latter. It will not be a draw bridge as its great height above the river renders a draw unnecessary. The floor of the bridge will be 50 ft. above the high water mark of the great flood of 1844. This will give ample room for the largest steamer to pass under the bridge without lowering her smokestacks. On the Jackson County side an iron trestle work will be built south from the bridge for a distance of 2,490 ft. The bridge proper will be 1,200 ft. long, or about 200 ft. shorter than the Hannibal bridge.

Cincinnati, Hamilton & Dayton.—At a meeting of directors in Cincinnati, July 23, it was decided to increase the dividend rate from 6 to 8 per cent. yearly, and in accordance with this the next quarterly dividend was made 2 per cent. The directors also voted to call a meeting of the stockholders to consider the question of issuing preferred stock for the purpose of taking up the outstanding bonds of the company.

Cincinnati, Indianapolis, St. Louis & Chicago.—At a special meeting in Indianapolis, July 26, the stockholders voted to approve the plan for refunding the company's debt by retiring the present bonds and issuing new bonds at a lower rate of interest. In order to enable the directors to carry out this plan, they voted to authorize the issue of $10,000,000 in 4 per cent. bonds, to be secured by a general mortgage upon the property.

The stockholders also voted to approve the new traffic agreement with the Illinois Central, under which this company secures the right to run its trains over the Illinois Central tracks between Kankakee and Chicago. This agreement takes effect at once, and is to continue for 99 years.

Danbury & Norwalk.—It is reported that this company has negotiated a lease of its road to the Housatonic Railroad Co. The basis of the lease, it is said, is a rental equivalent to interest on the bonds and 5 per cent. on the stock. The road extends from Wilson's Point in the town of Norwalk, Conn., to Danbury, 26½ miles, with 10 miles of branches. The company has a funded debt of $650,000, including $400,000 in 7s, $100,000 consolidated 6s, and $150,000 general mortgage 5s, the interest charge being $41,500 yearly. The stock is $600,000, which would make the rental on the reported basis $71,500 yearly. The company has a considerable local traffic and its earnings for several years past have been sufficient to meet all charges and leave a surplus for the stock. Last year it paid 5 per cent. dividends, in 1884 it paid 2½ and in 1883 the same. The company has valuable terminal property on deep water on Long Island sound at Wilson's Point, where there is room for considerable addition to the present facilities for handling freight.

Dayton & Ironton.—The statement for May and the five months to May 31 is as follows:

	May.	Five months.
Earnings	$11,584	$89,549
Expenses	19,170	95,497
Deficit	$7,586	$5,948
Charges	1,446	10,006
Total loss	$9,032	$15,954

The light earnings and the heavy expenses were largely due to heavy freshets along the line interrupting traffic and causing a heavy expenditure for repairs.

Eastern Shore.—In order to prevent the diversion of the trade of the Eastern Shore of Maryland to Philadelphia by existing lines, Baltimore people propose to build a railroad from a point on Chesapeake Bay opposite Annapolis through Talbot, Caroline, Wicomico, Dorchester and Worcester counties to the Atlantic shore, with a branch to Ocean City. There is hardly business enough on the Eastern Shore to support two systems of railroad.

Evansville, Indianapolis & Cincinnati.—This company, which was recently organized to build a branch of the Indianapolis & Evansville road from Elnora, Ind., to Lawrenceburg, on the Cincinnati, Indianapolis, St. Louis & Chicago, is asking for local subscriptions along the line. The company offers to build its road through Columbus, Ind., and to locate its repair shops at that point, provided the town will give $100,000.

Grand Valley.—This company has been organized to build a railroad from Rock Creek, Col., the terminus of a branch of the Denver & Rio Grande, to Glenwood Springs and Aspen. The company is organized in the interest of the Denver & Rio Grande, and the road will be turned over to that company when its reorganization is completed. The line to Aspen is intended to meet the Colorado Midland, which is building to that point, and to secure at least a share of the traffic.

Gulf & Pacific.—This company has been organized at Dallas, Tex., to build a railroad from that city to the coal fields of Wise County, and thence southwest to the New Mexico line. It is said that that company intends to purchase the Texas Trunk Railroad, and to use that road as a part of its line.

Hancock & Calumet.—This road, which was built last year to compete with the Mineral Range road in the Lake Superior copper district, has been sold to the Mineral Range Co., as noted elsewhere more fully.

Housatonic.—It is reported that this company is negotiating for a lease of the Danbury & Norwalk Railroad, as noted elsewhere. The Housatonic connects with the Danbury & Norwalk by its branch from Brookfield to Danbury, and such a lease would be of some advantage to it by removing local competition and also by securing control of the terminal property at Wilson's Point on Long Island Sound. These negotiations have given rise to a report that the Housatonic Co. is concerned in the project lately noted for a new line from line from Richfield, Conn., to Portchester, N. Y., and thence to New York City.

Houston & Texas Central.—The parties controlling the stock of this company have made a new offer to the bondholders for settlement, which is substantially as follows: The unpaid coupons on the first mortage, to and including Jan. 1, 1887, on the main line consolidated mortgage to Oct. 1, 1886, on the Waco Division consols to Nov. 1, 1886, and on the general mortgage to Oct. 1, 1886, should be funded in debenture bonds bearing 5 per cent. interest and having 10 years to run, principal and interest to be guaranteed by the Southern Pacific Co. The first mortgage bonds, all divisions, to accept hereafter 6 per cent. interest, the consolidated mortgage bonds 5 and the general mortgage bonds 4 per cent. The main line and Western Division firsts to be extended for 10 years, or until 1901, but to be subject to call and payments at any time at 110 after 1891, while the consols may be called at 105. In consideration of the reduced interest the Southern Pacific Co. will agree to guarantee the punctual payment of the interest. The coupons are to be funded at the reduced rates of interest, not at their face. This requires the first-mortgage bondholders to fund five coupons, the others only four; but the first of these first-mortgage coupons (due Jan. 1, 1885) was bought by the Southern Development Co. of all who would sell, which was nearly all.

The Houston & Texas Central Co. agrees to waive all claims in regard to sales of land, and will also agree that all money received from land sales shall be applied to the redemption of first-mortgage bonds at 110 and interest, and

consols at 105 and interest, all bonds so bought in to be cancelled.

The proposed agreement is not to be valid unless by Sept. 1 next it shall receive signatures of holders of $7,500,000 firsts, $300,000 coupons on firsts, $3,300,000 consols, and $2,700,000 general mortgage bonds. In case the agreement is accepted, holders of all bonds will be required to deposit them with the Central Trust Co. in New York, to be stamped as complying with the agreement and accepting the reduced rates of interest. The first-mortgage bonds now bear 7 per cent. interest, the consols 8, and the general mortgage bonds 6 per cent.

Indiana, Bloomington & Western.—Receiver Henderson has filed a petition in the United States Circuit Court, asking for authority to surrender the lease of the Cincinnati, Sandusky & Cleveland road. The Receiver states that the rental paid for that road has been nearly $80,000 yearly more than the net earnings of the leased road, and that it is impossible for him to continue to operate the road and to pay the rental, and he therefore asks authority from the Court to surrender the road. The Receiver also asks that the Cincinnati, Sandusky & Cleveland Co. be required to account for about $350,000 expended by the lessee in improvement of the road.

It is said that negotiations are in progress for a compromise between the two companies, by which the lease may be continued, but at a material reduction in the rental.

Illinois Central.—Chicago dispatches report that this company's engineers have begun to run a line from Freeport, Ill., northward, and the supposition is that they intend to go through to St. Paul.

It is also reported that the company has decided to build a line from its Northern Division at Freeport to Chicago, thus making a connection over its own tracks between Chicago and its Iowa line. For many years the business of those lines has gone to Chicago over the Chicago & Iowa and the Chicago, Burlington & Quincy tracks.

Kansas City & Omaha.—This road has filed articles of incorporation in Nebraska. The road is to run from Fairfield, in Clay County, Neb., to Stromsburg, in Polk County, where it will connect with the Omaha & Republican Valley Branch of the Union Pacific, and to Hardy, in Nuckoils County, where it will connect with the Burlington & Missouri River road. The capital stock is $1,000,000, and the incorporators are local capitalists.

Lake Erie & Western.—The United States Circuit Court in Chicago on July 23 gave a decision in settlement of the decree of foreclosure against this road. The question most in dispute was the priority of the McGourkey claim against the company. This claim was for $320,000, and represented a fund raised by several of the directors and put in the hands of McGourkey for the purpose of buying up the most pressing claims against the company in the hopes that a settlement of its difficulties might be arranged. The plan was not successful and the company subsequently confessed judgment in favor of McGourkey, and on his application a receiver was appointed, the foreclosure proceedings not having been begun until after the receivership was instituted. The Court now holds that the claim is valid against the company by deciding that it is not a lien prior to the mortgages, as was claimed. The decree of foreclosure specifies that this claim comes in after the mortgages on the road, and may also be declared junior to other claims by order of the Court.

The final decree of foreclosure was entered July 28. The Court appoints John A. Henry Special Master to sell the road after 60 days' public notice. The Eastern and Western divisions are to be sold separately, the minimum price of each division being fixed at $500,000. Purchasers will be required to pay in cash at least 10 per cent. and such further sum as the Court may direct, the balance to be payable in bonds.

Litchfield, Carrollton & Western.—Contracts have been let for 30 miles of this road, from Barnett, Ill., to Greenfield, Wilson and Crowley, of Chicago, having the contract for the grading and masonry and Collins & Larkworthy, of Carlinville, Ill., the contract for the bridging, trestles and track laying. Work is to be begun at once.

Louisville, Evansville & St. Louis.—The United States Circuit Court has confirmed the sale of this road under foreclosure to the Purchasing Committee representing the bondholders. The road, it will be remembered, was sold on June 9 last, the sale being made subject to the first mortgage on the Evansville Division and to receiver's indebtedness and other claims, amounting to about $4,000,000. The purchasers have made the necessary provision for meeting this indebtedness, and have complied with the other terms of the sale, and will not proceed to organize a new company in accordance with the plan adopted by the bondholders some time ago.

The Purchasing Committee has organized two new companies, one in Indiana and one in Illinois. As soon as the necessary legal formalities can be completed these two companies will be consolidated. The name of the road will not be changed.

Louisville, New Albany & Chicago.—It is reported that this company is considering the question of building an extension of its Indianapolis Division from Indianapolis to Cincinnati by the most practical and direct route which can be found.

Maine Central.—This company's statement for May and the five months to May 31, is as follows:

	May.		Five Months.	
	1886.	1885.	1886.	1885.
Earnings	$238,146	$222 338	$1,093 157	$1,045.842
Expenses	149.754	139,140	730,324	693,069
Net earnings	$88.392	$83.198	$367,833	$352,773

For the five months the gross earnings increased $52,315 or 5.0 per cent., and the expenses $37,255, or 5.4 per cent. leaving a gain of $15,060, or 4.3 per cent., in net earnings

Marshall, Paris & Northwestern.—Arrangements are being made to change the gauge of this road from 3-ft to standard, and it is expected that the work will be completed by Aug. 1. The road is now completed from Marshall, Tex., to Brushy Creek, 16 miles. The grading is done for some distance further.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of July 17:

The San Benito & Tapachula Railroad Co. has had its concession modified, and will be permited to import construction and operating material, and rolling stock, free of all duties for 15 years.

The Zacatecas, Jerez & Villanueva Railroad Co. by the terms of its modified concession is permitted to import construction and operating material and rolling stock for 15 years. The same privileges, for the same period, are also accorded the Mazatlan & Rosario Railroad Co. by the terms of its recently modified concession.

The Merido & Peto Railroad Co. by the terms of its modified concession is given 10 years' time in which to import, free of all duties, construction and operating material and rolling stock. The company is obliged to complete its line within 10 years, and during the coming 12 months must build at least 10 kilometers of way and keep up construction at this rate yearly. The company is permitted to charge for each passenger per kilometer transported as follows: First-class, 2 cents; second-class, 1½ cents; third-class, 1 cent. For each ton of freight carried one kilometer the following rates are to be charged: First-class, 5 cents; second-class, 4 cents; third-class, 3 cents.

The reformed concession of the company, formerly known as "The Interoceanic Railroad of Acapulco, Morelos, Mexico, Irolo & Vera Cruz," changes the name of the company to "The Interoceanic Railroad of Acapulco & Vera Cruz." All the concessions given in previous years for the construction of lines now the property of this company are merged into one, and in virtue of this change the trunk line will pass from Mexico to Vera Cruz *via* Irolo, Calpulalpam, San Martin, Puebla, Vireyes, Perote and Jalapa, and from Mexico to Acapulco via Morelos, Yautepec and Amacusac. The company is authorized to complete the following branches: From Vireyes to San Juan de los Llanos, from San Lorenzo to San Nicolas, and from Yautepec to Cuernavaca. For 15 years the company is to be permitted to import free of all duties, federal or local, material for the construction and operation and rolling stock. The company is obliged to build at least 50 kilometers of track each year, counting from July 1, 1887, over and above the 467 kilometers already built. The company must finish said lines within the maximum term of 12 years, counting from July 1, 1887.

Mineral Range.—The Boston *Traveller* of July 26 says: "The Mineral Range Railroad Co. has, after long continued negotiations, finally consummated the purchase of the Hancock & Calumet road. The fact that some kind of a trade has been under consideration, has been known to a few insiders, but the additional fact that the sale was actually accomplished two or three months ago has been kept remarkably quiet, and it has now only been brought to light by a deal inquiry. The Hancock & Calumet road is owned, as is well known, by the Osceola-Tamarack people and is the line by which the ore of the latter mine is transported to Hancock and thence put into the market. It is 18 miles long and has only been in operation since last fall, and has but recently begun to carry passengers. Notwithstanding, however, that it is a new road, it has been earning for some time between $2,500 and $3,000 net per month. It is capitalized for $350,000 in 35,000 shares, and by the terms of the sale the Mineral Range people (really the Calumet & Hecla Mining Co.) take 25,000 shares, paying $250,000 in cash therefor in five equal quarterly installments. The first of these was paid about May 1, and another is now due in a few days, or about Aug. 1. The Tamarack people consider that they have made an excellent trade, especially as they still retain 10,000 shares of the company's stock, and have protected the transportation of their ore for several years to come by long contracts. It is now said that the Calumet & Hecla people will soon extend the road to the Osceola mine."

Missouri Pacific.—The new branch from Greenville, Tex., to Dallas is now graded from Greenville to Rockwall, 28 miles, leaving 22 miles to be graded to Dallas, and tracklaying will shortly be begun.

A new branch of this line is to be built from Gainesville, Tex., westward to a point in the centre of Baylor County, a distance of about 130 miles. This branch will be built by a company called the Gainesville, Henrietta & Western, which has been incorporated by parties in the Missouri Pacific's interest.

Texas papers state that work will soon be begun on a new branch, which will leave this company's Dallas & Wichita line about 3 miles from Dallas, thence along the west fork of Trinity and down the east side of the Cross Timbers to Mansfield and Brownwood. From Brownwood the projected line is up the Colorado River to Fort Concho, and thence to Fort Stockton. The object of this branch is doubtless to secure the cattle business of Western Texas, but it is not very likely to be built unless the Missouri Pacific Co. loses control of the Texas & Pacific.

Moncton & Buctouche.—The St. John (N. B.) *Telegraph* says: "The Moncton-Buctouche Railway (32 miles) was commenced a few weeks ago and will be completed this fall. The first sod was turned at Buctouche in November last, but active operations were commenced this spring, when the line was located and grading commenced.

"Messrs. Wheten, Gray, Clark & Trites have contracted for the entire line. Sixteen miles of the road have been graded up to the present time, 6½ miles of this forming a continuous stretch at the Buctouche end. The company expects to be tracklaying in about four weeks. Negotiations for rails and rolling stock are in progress. Grading will be concluded in six weeks. Before the close of the season the company anticipate the completion of the line as far as Buctouche River, three-quarters of a mile from the town. Here a large bridge requires to be built next winter before the town itself can be reached. The principal bridges on the line are as follows: Water-works bridge, 400 ft. long, four miles from Moncton; Shediac River, 400 ft. long; bridge at McDonald's, 200 ft.; Cocagne River, 500 ft. long; Little Buctouche River, 450 ft. long; and the Buctouche River bridge, which will be a Howe truss structure, 1,100 ft. in length. The stations will be located at Moncton, Irishtown, Scotch Settlement, Gagnons, Cocagne, Ohio, Little Buctouche and Buctouche. Five hundred men and 150 teams are now employed along the line."

Montana Union.—This company was recently organized by agreement between the Union Pacific and the Northern Pacific companies. The new company is now laying a third rail for standard gauge over the Utah & Northern road from Butte to Garrison, the junction with the Northern Pacific, a distance of 51 miles. As soon as this third rail is laid the road will be operated by the Montana Union Co., and will be open to the trains of both the Union and the Northern Pacific. The board of directors of the Montana Union Co is composed of three representatives from each company, with a seventh member as arbitrator in case of disagreement.

Nashville, Chattanooga & St. Louis.—This company's statement for June and the fiscal year ending June 30 is as follows:

	June.		Year.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$178.139	$147.700	$2,188,110	$2,240,719
Expenses	102,934	85,797	1,322,858	1,304,002
Net earn	$75,205	$61,903	$865,252	$936,717
Interest and taxes			675,096	682,273
Improvements			45,221	58,402
Total charges			$720,317	$740 675
Net surplus			$144.935	$196,042

This shows for the year a decrease in gross earnings of $52,609, or 2.4 per cent.; a decrease in net earnings of $71,465, or 7.6 per cent.; and a decrease of $51,107, or 26.1 per cent., in the net surplus.

New Hampshire Railroads.—Messrs. O. C. Moore, E. B. S. Sanborn and E. J. Tenney, Railroad Commissioners of New Hampshire, have issued their annual report for 1885. The document exceeds 100 pages in length, and contains a large amount of statistical and other information regarding the railroad system of the state. The report states that the mileage of steam railroads for the year is the same as in 1883—1,043.74, and the Commissioners are not aware that the construction of any new lines is contemplated. The gross earnings of the steam roads for the year were $17,989,140, and the net income $6,296,973. Compared with 1884, this result shows a large apparent increase, which is explained by the inclusion of the Eastern and the Boston & Lowell systems, the former being included in the return of the Boston & Maine road, and the latter including its business in Massachusetts as well as New Hampshire, which are now merged. The capital stock of the corporations owning or operating railroads in the state, and reporting to this board, is $44,820,977. This includes the entire capital stock of the Boston & Maine, the Boston & Lowell, the Portland & Ogdensburg, the Nashua & Lowell, the Fitchburg, the Portland & Rochester, and the Nashua, Acton & Boston railroads. Making proper deductions for the capital stock of these corporations expended in other states, the capital stock expended in New Hampshire will approximate $23,000,000. The funded indebtedness of the above corporations is $27,664,600. The floating debt, approximately estimated, is $6,117,381. Of 35 corporations reporting for 1885, 26 paid dividends varying from 2 to 10 per cent. The average for all the roads reporting was 4.41 per cent. The total amount in dividends was $2,051,521. This included the Boston & Lowell dividend. Deducting the latter ($251,151) and the Dover & Winnipesaukee dvidend ($28,800), which was not reported last year, the amount is less than the previous year by $57,626.

The physical condition of the roads throughout the state is greatly improved, no serious accident having occurred during the year. Special improvements on various lines are noted, and on all the principal lines great attention has been paid to improving the roadbed, iron and ties, to strengthening and guarding the bridges, and to superseding old by new and better equipment. This improvement has also extended to stations on most of the roads, and some of these improvements are exceptionally admirable and creditable.

Much space is devoted to the subject of grade crossings, and several valuable suggestions are made by the Commissioners. A review of the work of the Commissioners during the two years of the existence of the Board shows decisions in some 40 cases, in all but one of which there has been a ready acquiescence.

New Haven & Northampton.—At a special meeting o the stockholders, held in New Haven, Conn., July 26, resolutions were passed authorizing the issue of convertible bonds to the amount of $700,000 for the purpose of funding the floating debt. This floating debt has been carried along for several years, most of it having been incurred in the construction of the northern extension of the road to connect with the Hoosac Tunnel line.

New York Arcade.—A number of Broadway property owners, who are opposed to the construction of this line through Broadway, in New York city, have appointed a committee to represent their interests, and that committee will shortly begin action in the courts to enjoin the company from beginning work, and will also apply to have the company dissolved, on the ground that the act of the Legislature granting its franchise is unconstitutional. It is claimed that the company ceased to exist in reality in 1878, and that the act of last year was special legislation, not authorized by the constitution of the state. The parties opposed to the building of the road claim that, if it is constructed on the plans adopted by the company, it will make necessary the rebuilding of the foundations of a number of the large buildings.

New York, Chicago & St. Louis.—It is reported in New York, on the strength of cable dispatches, that a heavy loan has been negotiated in London by the Lake Shore Co. for the purpose of adjusting matters with the bondholders of this company. The report lacks confirmation.

New York, Lake Erie & Western.—The statement for June and the nine months of the fiscal year from Oct. 1 to June 30 is as follows, the figures including 68 per cent. of the gross earnings and all the working expenses of the leased New York, Pennsylvania & Ohio road.

	June.		Nine months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$1,887.505	$1,451,933	$16.223.110	$13,799.729
Expenses	1,332.928	1,136 410	11,620,947	10,664,282
Net earnings	$554.577	$315,523	$4,602.163	$3,135,447

The earnings of the Erie lines proper, excluding all earnings and expenses of the leased road, were as follows:

	June.		Nine months.	
	1886.	1885.	1885-86.	1884-85.
Earnings	$1,536 808	$1 202.186	$13,224,098	$11,239.552
Expenses	986,747	839,426	8,666,368	7,986.931
Net earnings	$550,061	$362,760	$4.557,730	$3,252,621

For the nine months the gross earnings increased $1,984,546, or 17.6 per cent., and the net earnings $1,305,109, or 28.8 per cent.

A comparison of the statements shows that for the nine months of this year the 68 per cent. of gross earnings of the leased road amounted to $2,999,012, and the working expenses to $2,954,579, leaving a profit of $44,433 on the lease, against a loss of $117,174 last year.

New York & New England.—The Hartford (Conn.) *Courant* of July 23 says: "The Supreme Court on Tuesday reached a decision in the New York & New England preferred stock suit—the question whether the dividend might be paid. The fact was not known until yesterday in this city. The Hon. John Hooker, Reporter for the Court, is off on a vacation, and in his absence the information was some time in reaching the public.

"It will be remembered that the directors declared a half-year dividend of 3½ per cent. on the preferred stock, and the owners of some of the common stock intervened and objected, on the ground that the capital of the company was confessedly impaired about $750,000, and that under statute a corporation cannot pay dividends when its capital is impaired. These must come from surplus.

"The Supreme Court decided that the dividend may be paid. It holds that the act authorizing the issue of preferred stock was special legislation of such a nature as to authorize the dividend, if it were earned. The provision of the preferred stock is that it shall receive 7 per cent. from 'the net earnings of the year,' and, if the earnings do not reach this sum, the dividends shall be cumulative. This deficiency of $750,000 existed when the issue of stock was authorized, and it was evidently a condition of the contract that net earnings of the year should be reckoned by themselves for the year and not be absorbed in a previous deficit, which it might take several years of prosperity to wipe out. The certificates of the preferred stock are, by their condition, to be surrendered as soon as the 7 per cent. has been paid, and new ones will be issued in their place. They are evidently in the nature of certificates of indebtedness and are entitled to be cleared away whenever the earnings of the year will do it.

"This is the special privilege of the preferred, as against the common stock the deficiency still stands, under the statutes, as a bar to dividends."

Norfolk & Western.—Track is reported laid on the Cripple Creek Extension of this road, which leaves the main

line at Pulaski, Va., 316 miles from Norfolk, and runs to Pierce Furnace, a distance of 23 miles. The new extension runs through a mineral country for its whole length, and reaches two blast furnaces and several mines already opened. This branch is south of the main line (the New River Division being north of the main line) and runs into a new country, heretofore entirely without railroad facilities.

The statement for June and the six months to June 30 is as follows:

	June.		Six months.	
	1886.	1885.	1886.	1885.
Earnings	$228,126	$191,767	$1,449,388	$1,237,030
Expenses	142,722	134,713	883,292	791,337
Net earnings	$85,404	$57,054	$566,096	$445,693
Per cent. of exps.	63	70	61	64

For the six months the gross earnings increased $212,358, or 17 per cent., and the expenses $91,955, or 12 per cent., the result being a gain of $120,403, or 27 per cent., in net earnings.

The statement says: "The entire line was closed to business on June 1, on which day the gauge was changed from 5 ft. to 4 ft. 9 in. simultaneously with the change of all broad-gauge roads in southern systems. The month of June, therefore, contained one working day less than June, 1885, and the earnings were diminished to that extent. The process of changing the gauge of freight cars continued throughout June, and earnings were thereby further restricted. Notwithstanding these impediments, however, the gross earnings were 19 per cent. greater, and the net earnings 50 per cent. greater, than in June, 1885."

Northern Central.—This company's statement for June and the six months to June 30 is as follows:

	June.		Six months.	
	1886.	1885.	1886.	1885.
Earnings	$432,536	$416,219	$2,582,401	$2,597,772
Expenses	337,068	280,239	1,683,021	1,554,597
Net earnings	$95,468	$135,980	$899,380	$1,043,175

For the half-year the gross earnings decreased $15,371, or 0.6 per cent., and the expenses increased $128,424, or 8.3 per cent., the result being a decrease of $143,795, or 13.8 per cent., in net earnings.

Orange Belt.—The following circular from General Freight and Passenger Agent G. D. Ackerly is dated Longwood, Fla., July 20: "The Orange Belt Railway, now building from Monroe Station, on the Jacksonville, Tampa & Key West, *via* Lake Apopka, to the Gulf, will be opened for business between Monroe and Longwood, on Monday, July 26. Freight for the following-named stations should be marked and way-billed 'Care O. B. Ry., Monroe Station': Monroe, Sylvan Lake, Paola, Island Lake, Glen Ethel, Longwood Junction and Longwood. It is expected that the line will be in full operation to Oakland, on Lake Apopka, by Sept. 1 next. Complete freight and passenger tariffs will be furnished at an early date."

Pennsylvania.—The statement of the business of all lines east of Pittsburgh and Erie for June, 1886, as compared with the same month of 1885, shows an increase in gross earnings of $600,463; an increase in expenses of $158,774; increase in net earnings, $441,689. The six months of 1886 as compared with the same period of 1885 show for the same lines an increase in gross earnings of $1,930,571; increase in expenses, $780,806; increase in net earnings, $1,149,765.

Carrying out these differences, we have the following statement:

	June.		Six months.	
	1886.	1885.	1886.	1885.
Earnings	$4,336,102	$3,735,639	$22,250,171	$21,319,600
Expenses	2,984,976	2,826,202	15,580,748	14,799,942
Net earnings	$1,351,126	$909,437	$7,669,423	$6,519,658
Per c. of exps.	68.8	75.6	67.0	69.4

All lines west of Pittsburgh and Erie for the six months of 1886 show a deficiency in meeting all liabilities of $650,198, being a decreased deficiency as compared with the same period of 1885 of $336,892. The net gain on all the lines was thus $1,486,657 for the half-year.

Philadelphia & Reading.—The United States Circuit Court has denied the motion made by Mr. Gowen to require the witnesses in the Robinson suit for the foreclosure of the general mortgage to answer certain questions which he put to them. The court held that Mr. Gowen's questions were not relevant to the issue in hand.

The Pottsville (Pa.) *Miners' Journal* thus describes the new possenger station which is to be built for this road in Pottsville: "The new station, for the construction of which bids are now being received, will be located on Norwegian and Railroad streets, the entrance being on Norwegian street. The building will be 60 ft. on the Norwegian side and 52 ft. on Railroad street. It is to be two full stories, the first story to be built of brick and the second frame, to be covered outside with stained shingles. The vestibule on Norwegian street will be 8 ft. wide and one story high. This will open into a hall 12 ft. wide and 42 ft. long. On the south side of the hall will be the ladies' and gentlemen's waiting rooms, ticket office and toilet rooms, and on the upper side, the express office, stairway and baggage rooms. The gentlemen's waiting room will be 25 by 18 ft., and the ladies' room 24 by 18 ft. On the second floor will be the Division Engineer's offices, divided into three apartments, a conductor's room and the Superintendent's business and private offices. The building will be surmounted by a small dome on the northwest corner. There will be an exit 10 ft. wide on the railroad side, and the track will be under roof the full length of the depot. Shedding will also extend along the front of the building."

The Receivers' statements give the following figures for the earnings of the railroad for June and the seven months of the fiscal year from Dec. 1 to June 30:

	June.		Seven months	
	1886.	1885.	1886.	1885.
Earnings	$2,532,364	$2,428,293	$16,013,247	$15,025,765
Expenses	1,482,425	1,484,837	9,727,348	9,345,617
Net earn.	$1,049,939	$943,456	$6,285,899	$5,640,148

For the seven months the gross earnings increased $987,482, or 6.6 per cent., and the net earnings $645,741, or 11.5 per cent.

The traffic reported is as follows:

	June.		Seven months.	
	1886.	1885.	1886.	1885.
Tons coal	1,115,472	1,034,133	6,863,151	6,197,513
Tons merchandise	986,109	733,660	5,943,525	4,423,181
Passengers	2,214,916	2,081,225	13,669,411	12,582,894
Tons coal on colliers	45,475	51,933	296,392	315,454

There was a large increase both in passengers and tonnage, for the month and for the year.

The earnings of the Philadelphia & Reading Coal & Iron Co. were as follows:

	June.		Seven months.	
	1886.	1885.	1886.	1885.
Earnings	$1,311,840	$1,320,095	$7,778,325	$7,710,939
Expenses	1,545,414	1,399,686	8,975,676	7,918,577
Deficit	$233,574	$79,591	$1,197,351	$207,638

For the seven months there was an increase in gross earnings of $67,386, or 0.8 per cent., but there was also an increase in the deficit of $989,713, or 476.0 per cent.

The coal mined from the company's lands was as follows:

	June.		Seven months.	
	1886.	1885.	1886.	1885.
By Coal & Iron Co.	539,431	410,862	2,884,116	2,482,736
By tenants	50,034	69,911	340,481	406,284
Total	589,465	480,773	3,224,597	2,889,020

The total increase in the output for the seven months was 335,577 tons, or 11.6 per cent.

The joint net earnings of the two companies were:

	June.		Seven months.	
	1886.	1885.	1886.	1885.
Railroad Co. net	$1,049,939	$943,456	$6,285,899	$5,640,148
Coal & Iron Co., def.	233,574	79,591	1,197,351	207,638
Total net	$816,365	$863,865	$5,088,548	$5,432,510

The decrease in the total for June was $47,500, or 5.5 per cent.; for the seven months, $343,962, or 6.3 per cent. As the expenses reported do not include anything for interest or rentals, the net earnings given above are the sums from which all fixed charges are to be provided.

Pittsburgh & Western.—Work has been begun on the extension of this company's leased Pittsburgh, Cleveland & Toledo road from Akron, O., to a junction with the Chicago Division of the Baltimore & Ohio at Tiffin. The road will be 91 miles long, and will be built by a corporation called the Ohio Railroad Co., which was organized some time ago. The new road will complete the Baltimore & Ohio's direct line from Pittsburgh to Chicago.

Providence & Worcester.—The reported negotiations for a sale or lease of this road to the Boston & Maine Co. are denied by officers of both companies.

St. Joseph & St. Louis.—A meeting of the stockholders was held in St. Louis, July 22, at which the directors were authorized to issue $225,000 in first mortgage bonds, for the purpose of buying equipment and making necessary improvements on the road. The line extends from St. Joseph, Mo., to Lexington, 76 miles, and was for a number of years operated by the Wabash, St. Louis & Pacific Co. The stockholders recently resumed possession of the road and are now operating it. The property is represented entirely by the stock, there being no floating debt except the first mortgage bonds just authorized.

St. Louis, Arkansas & Texas.—At a special meeting held in St. Louis, July 22, the stockholders voted to authorize the issue of first-mortgage bonds to the amount of $4,000 per mile, for the purpose of changing the road from 3 ft. to standard gauge. This amount will make up the full issue of $13,000 per mile authorized by the agreement of reorganization and the articles of incorporation for the new company. The $9,000 per mile previously authorized will be used in paying off receiver's certificates and other prior liens and the cost of the foreclosure and reorganization.

It is announced that a syndicate of New York bankers, including Kuhn, Loeb & Co., E. C. Benedict & Co. and others, has taken $1,500,000 of the new bonds at about par, and the money will be paid into the Central Trust Co. to be used as required. This will enable the company to push the work on the change of gauge. It is understood that the rest of the issue will not be sold until more money is needed, the officers of the company believing that the market price of the bonds will increase.

Negotiations are completed for the building of a branch line from Mt. Pleasant, Tex., through Silver Springs, to Sherman, and the people of Sherman have agreed to give substantial aid. This branch was surveyed some two years ago, but its construction was postponed on account of the financial difficulties of the company.

St. Louis & Chicago.—Track is reported laid on this road from Litchfield, Ill., northward to Springfield, a distance of 45 miles. Regular trains will shortly be put on the road and will be run through from Springfield to St. Louis, the company having made arrangements for the use of the Indianapolis & St. Louis tracks from Litchfield to St. Louis. The new road is intended to form part of a new line between St. Louis & Chicago. It will be extended from Springfield to Pekin by the Peoria, St. Louis & Chicago Co., recently organized, and will connect at Pekin with the Chicago & St. Louis roads.

San Antonio & Aransas Pass.—The latest time-table of this road, taking effect July 19, shows trains running to Papalote, Tex., 20 miles beyond the late terminus at Beeville and 116 miles southeast from San Antonio. Work on the road is progressing steadily.

Sharpsburg & Shenango.—This company has been organized to build a railroad from Shenango, Pa., to Mercer, a distance of 13 miles. The office is in Sharpsburg, Pa., where all the incorporators reside.

Sinaloa & Durango.—A despatch from the City of Mexico says that the reformed concession granted the Sinaloa & Durango Railway Co., a Boston organization, is an extensive document, occupying nine columns of the *Diario Official*. The company is authorized to construct four distinct lines—the first from Culiacan to the seaport of Altata; the second from the city of Durango to Mazatlan, with the right to extend the line to Villa Lerdo, on the Central road, and thence on to Saltillo, where the national road is now built; the third from Culiacan to Mazatlan, and also to Alamos; the fourth from the city of Durango to some point on the Rio Grande River, after passing through the State of Coahuila. Surveys must begin within six months. Plans for the first section of 100 kilometers have to be submitted within 18 months, and work must begin within three years. The capital is limited to $20,000 per kilometer, and the subsidy fixed at $7,000 a kilometer.

Southern Pacific.—A circular from this company announces the opening of the Northern Division for traffic to King City, Cal., 20.3 miles south of the terminus at Soledad and 163.2 miles from San Francisco. The track is laid for several miles southward from the operating terminus.

South Florida.—This company is making preparations to change the gauge of its road from 3 ft. to standard, and it is expected that the change will be made by Sept. 1. The road extends from Sanford, Fla., to Tampa, 115 miles, with about 80 miles of branches. The road is controlled by the owners of the Savannah, Florida & Western road.

Texas & Pacific.—It is announced that Mr. Robert Fleming, who was sent to New York recently by English boudholders to represent their interest, has given his approval to the plan prepared by the New York Committee and has declined to join interest with the Wistar Committee. It is stated that Mr. Fleming has offered to buy at par the consolidated bonds which have been deposited with the Wistar Committee in order to facilitate the reorganization of the company.

It is said that Mr. Fleming has made a formal proposition to buy the consolidated bonds in the interest of the parties whom he represents at 96 and accrued interest. This proposition was to be considered at a meeting held in Philadelphia, July 30.

Topeka & Lincoln.—This company has filed articles of incorporation to build a railroad from Topeka, Kan., northward to Lincoln, Neb. Several of the incorporators are directors of the St. Joseph & Grand Island road.

Tucson & Globe.—Work has been for some time in progress on this road, which is to run from Tucson, Ari., on the Southern Pacific road, northward to the Globe mining district. The track is reported laid for 7 miles from Tucson, and the builders expect to have the line finished to San Pedro, 35 miles, by September.

Vicksburg, Shreveport & Pacific.—This company has completed its arrangements to exchange the income bonds at 50 for new bonds having 30 years to run from Jan. 1, 1886, and bearing no interest for two years, 3 per cent. for three years, 4 per cent. for three years and 5 per cent. there after. The new issue will have a first lien on the land grant and will be a third mortgage on the railroad. The amount of the income bonds is $1,920,000. The stock not held by the Alabama, New Orleans, Texas & Pacific Junction Co. will also be exchanged for these new bonds at 25.

Wabash, St. Louis & Pacific.—In Chicago, July 22, the United States Circuit Court made an order allowing Mr. Henry Lardner, who represents $217,000 in bonds of the Chicago Division, to become a party in the foreclosure suit, in order to protect his own rights and those of other holders of the Chicago Division bonds who may join with him. The Court also made an order directing the Receivers of the road to report within 15 days the earnings and expenses of the Chicago Division from June 28, 1884, and to report also the method by which they ascertain such earnings and expenses, and also the rentals which have been due and have been paid by them to the Chicago & Western Indiana Co. from the same date, and to report all other facts which may be necessary to enable the Court to understand the position of the Chicago Division and how it has been managed under the receivership.

The Romaine Committee, appointed by the holders of first-mortage bonds on the lines east of the Mississippi, have prepared an agreement which they ask the bondholders to sign. This agreement empowers the committee to act for the bondholders to take legal proceedings to compel the payment of interest now in default and, if necessary, to begin foreclosure proceedings. They also agree to pay an assessment of $5 per bond for the purpose of meeting the necessary expenses of the committee.

Wilkes-Barre & Western.—This company has executed a mortgage for $1,000,000 on its projected line. The company was recently organized to build a railroad from Shickshinny, Pa., on the Bloomburg Division of the Delaware, Lackawanna & Western, west to Watsontown in Northumberland County.

Wisconsin Central.—A dispatch from Milwaukee, July 24, says: "The officers of the Wisconsin Central and the Chicago, Milwaukee & St. Paul met this afternoon and completed the arrangements whereby the Central is guranteed terminal facilities at this point for the next five years. The agreement has been pending for some time, and was discussed and revised at the meetings of the directors of both roads, but it was not until this afternoon that it was officially signed. This agreement will benefit both roads, the St. Paul especially, as it will remove all danger of the Central building a competing line to this city, as intended.

"The Wisconsin Central has completed arrangements with the St. Paul, Minneapolis & Manitoba road, whereby the Central's solid trains, with their own conductors, will be run into Minneapolis over the Manitoba line."

ANNUAL REPORTS.

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Nashville, Chattanooga & St. Louis.

This company owns a main line from Chattanooga, Tenn., through Nashville to Hickman, Ky., 354 miles; the Lebanon Branch, 30; the McMinnville Branch, 61; the Fayetteville Branch, 40; the Centreville Branch, 47; the Duck River Valley road, 8; a total of 580 miles. The following figures for the year ending June 30 are from a preliminary statement issued in advance of the full report;

The earnings of the road were as follows :

	1885-86.	1884-85.	Inc. or Dec.	P.c.
Earnings	$2,188,110	$2,240.719	D. $52,60	2.3
Expenses	1,322,858	1,304 002	I. 18,856	1.4
Net earnings	$865,252	$936,717	D. $71,465	7.6
Gross earn. per mile.	3,773	3,863	D. 90	2.3
Net earn per mile..	1,493	1.615	D. 122	7.6
Per cent. of exps. ..	60.5	58.2	I. 2.2	....

The decrease in earnings and increase in expenses were probably, if the same conditions prevailed as on other lines in the same territory, due to a general decrease in rates or an increase of traffic.

The earnings of the several lines were as follows :

	Gross earnings.	Net earnings.	Sur. and def.
Main Stem	$1,941,231	$770,233	S. $155.961
Lebanon Branch	55,152	27,661	S. 6,903
McMinnville Branch	61,135	25,193	S 3,328
Fayetteville Branch	47,052	12,408	D. 18
Centreville Branch	50.851	20,646	D. 3,429
Duck River Valley R.R.	32,689	9,111	D. 17,750
Total	$2,188,110	$865,252	S. $144,935

In this statement the surplus is the amount left after deducting interest, taxes and expenditures for improvements. The payments for improvements were : Main Stem, $44,057 ; McMinnville Branch, $850 ; Fayetteville Branch, $314 ; total, $45,221.

The income account for the year is as follows :

Net earnings, entire line, as above		$865,252
Interest and taxes	$675,096	
Improvements of property	45,221	
		720.317
Surplus for the year		$144,035

The surplus for the preceding year was $196,042. The cost of changing gauge from 5 ft. to 4 ft. 9 in. was $51,291; it is not included above.

Chicago & Northwestern.

At the close of the 27th fiscal year, May 31, 1886, this company operated 3,948.71 miles of road, the statement of mileage by divisions being as follows :

	Miles.
Wisconsin Division, Chicago to Ft. Howard, and branches	555.26
Galena Division, Chicago to Clinton, and branches	400 98
Iowa Division, Clinton to Council Bluffs, and branches	743:49
Northern Iowa Division, Tama to Elmore, and branches	369.81
Madison Division, Belvidere to Winona, and branches	483.53
Peninsula Division, Ft. Howard to Lake Angeline Mine, and branches	376.38
Winona & St. Peter Division, Winona to Watertown, and branches	448.48
Dakota Division, Minnesota line to Pierre and branch	570.78
Total mileage worked	3,948 71

Of this mileage 3,344.64 miles are laid with steel, leaving 546.81 miles of main track still laid with iron rails.

Additions during the year were 104.40 miles, as noted more in detail below. The average mileage worked for the year was 3,891 45 miles, against 3,819.37 miles for the preceding year.

Of the total mileage 2,458.69 miles are owned by the company directly, and 1,490.02 miles owned through proprietary companies. Of the whole line 587.50 miles are in Illinois ; 920.91 in Wisconsin; 308.49 in Michigan; 1,112.08 in Iowa; 414.47 in Minnesota, and 605.26 miles in Dakota.

The additions last year were the Northern Illincis road, from Belvidere, Ill., to Spring Valley, 77 miles, and a branch of the Dakota Central from Centreville, Dak., to Yankton, 28.4 miles.

The company also owns, through ownership of stock, the Sioux City & Pacific, 107.42 miles, and the Fremont, Elkhorn & Missouri Valley, 502.80 miles ; but the accounts of those roads are stated separately and not included in the figures below.

The equipment consists of 698 locomotives ; 258 first-class passenger, 26 second-class passenger, 11 parlor, 9 dining, 39 combination, 26 mail, and 109 baggage and express cars ; 11,459 box, 117 refrigerator, 19 milk, 1,914 stock, 950 gondola, 2,197 flat, 3,857 iron ore and 395 caboose cars ; 7 officers' and pay cars ; 18 boarding, 25 dump, 82 ditching and 26 pile driving and wrecking cars. The increase last year was 28 locomotives ; 5 passenger, 4 parlor and 4 combination cars; 25 box, 2 milk, 500 gondola and 42 caboose cars.

The general balance sheet, condensed, is as follows :

Liabilities.	
Stocks, common	$41.374,866
" preferred	22.325.455
" proprietary lines	11.230,000
Funded debt	90 511.500
Sinking funds	4,°39.175
General liabilities	162,000
Operating liabilities (current accounts)	4,578,136
Income account, balance	11,144.326
Land income account	3,194.071
Total liabilities	$188,759.528
Assets.	
Road and equipment	$163,529,848
Trustees of sinking funds	4,239.175
General assets, securities owned, etc	14.130,642
Materials	2,000,734
Accounts receivable	1.926,281
Cash	2,932,848
Total assets	$188,759,528

The stock remained unchanged; the amounts given above include scrip. Of the total amount the company holds $2,285 preferred and $10,007,116 common stock.

There were issued during the year $4,402,000 consols in place of old bonds retired; $135,000 sinking fund 6s of 1879; $250,000 sinking fund 5s of 1879; a total of $4,787,000 new bonds. There were retired and canceled $5,736,000 bonds of various issues, making a net reduction of $949,000 in the bonded debt.

Expenditures for new construction and equipment were $2,865,204. From this amount is to be deducted $1,728,-460, balance of premiums on securities and sundry construction credits, leaving a net addition of $1,136,744 to construction accounts.

The Land Department reports sales from the Minnesota grant of 59,558 acres at an average of $5.85 per acre; from the Michigan grant of 24,068 acres at an average of $2.72; from the Wisconsin grant 4,124 acres at an average of $3.72. There were also sold 1,863 town lots. The total amount of sales was $806,856. The net cash receipts on land accounts were $663,689. At the close of the year there were 1,293,-832 acres of unsold lands (420,429 in Michigan, 299,041 in Wisconsin and 574,362 in Minnesota) and the company held land notes and contracts amounting to $1,209,502 in all.

The earnings for the year was as follows :

	1885-86	1884-85.	Inc. or Dec.	P c.
Freight	$17,503.244	$16,917.394	I. $585.850	3.5
Passengers	5,646,150	5,498,111	I. 148,039	2.7
Mail and express	858,220	870,938	D. 12,718	1.5
Miscellaneous	271,986	215,613	I. 56,373	26 1
Total	$24.279,600	$23.502,056	I. $777,544	3.3
Expenses	13,859,226	13,793,907	I. 65,319	0.5
Net earnings	$10,420.374	$9,708,149	I. $712,225	7.3
Gross earn. per mile.	6,229	6,153	I. 86	7.3
Net " " "	2,678	2.54²	I. 136	5.4
Per cent. of exps.	57.1	58.7	D. 1.6	....

Expenses include taxes, which last year amounted to $702,452, or 2.9 per cent. of the gross earnings.

The following table shows the average mileage worked and the earnings per mile, etc., for eight years past :

	Miles operated.	Earnings per mile.	Per cent. of expenses and taxes.	Net earnings per mile.
1879	2,129.37	$7,848	58.86	$3,228
1880	2,215.83	7.830	48.60	4 025
1881	2,644.16	7.312	53.92	3.369
1882	3.032.90	7.809	53.37	3.642
1883	3,464.70	6,951	58.44	2,889
1884	3,719.58	6,727	60.51	2,656
1885	3,819.37	6,153	58 69	2,542
1886	3,891.45	6,239	57.08	2,678

There were used in renewals 16,701 tons of steel rails and 975,880 new ties. The usual improvements of road, bridges and buildings were made during the year. In the bridge over the Mississippi at Clinton four spans (150 ft. each) were replaced by heavier spans of iron. In the Winona bridge five iron spans (160 ft. each) on masonry piers were put in to replace wooden spans on pile piers.

The result of the year was as follows :

Net earnings, as above		$10,420,374
Interest on bonds (less credit items)	$5 536,363	
Sinking funds	58,000	
Dividends paid	3,444,504	
		9,038.867
Balance, surplus for the year		$1.381 507
Balance from previous year		9.762.819
Income account, balance, May 31, 1886		$11,144 326

The dividends paid were 7 per cent. on the preferred and 6 per cent. on common stock; against 8 per cent. on the preferred and 7 on common stock for 1884-85.

The traffic for the year was as follows :

	1885-86.	1884-85.	Inc. or Dec.	P.c.
Pass. train miles.	5,962,400	5,839.699	I. 122.701	2.1
Freight "	11,044.442	10,711,876	I. 332,566	3.1
Total loco. miles	22.571,327	21,992,610	I. 578,717	2 6
Passengers car..	9.140.165	8,403 884	I. 736 311	8 8
Passenger-miles.	239,150,020	231.090,788	I. 8,059,232	3.5
Tons freight car.	8,494,239	8,235,127	I. 259,112	3.1
Ton-miles	1,466,892,717	1,416,789,205	I. 50,103,512	3.5
Av. train-load :				
Passengers, No..	40.1	39.6	I. 0.5	1 3
Freight, tons	123.3	125.3	D. 2.0	1.6

The average passenger journey last year was 26.16 miles ; the average freight haul, 167.51 miles. The average train was 4.49 passenger, or 19.90 freight cars.

The average receipts per train-mile and per unit of traffic were, in cents :

	1885 86.	1884-85.	Inc. or Dec.	P.c.
Per passenger train mile	111.00	111.00	....	....
" " " " net	56.60	53 00	I. 3.00	5.7
Per freight train mile	160.00	159.00	I. 1 00	0.6
" " " net	64.00	62.00	I. 2 00	3.2
Per passenger-mile	2.36	2.38	D. 0.02	0.8
Per ton-mile	1.19	1.19	....	....

Locomotive service cost last year 18.28 cents per mile run, a decrease of 1.46 cents, or 7.4 per cent. Locomotives ran 1.33 miles to each revenue train-mile.

The average number of trains on the company's lines for each working day was 295.78 passenger and 531.77 freight.

FUNDED DEBT.

President Keep's report says : "Quite important changes occured in the funded debt within the year, as will be seen in the statement which follows : On Aug. 1 last four old issues of 7 per cent. bonds, consisting of general first-mortgage; preferred sinking fund; Appleton Extension and Green Bay Extension bonds of the Chicago & Northwestern Co., fell due and were paid off, excepting a remnant of $6,000, which has not yet been presented, and consolidated sinking fund bonds, in like amount, were issued in accordance with the provisions of the trust deed securing the same. The amount of consolidated sinking fund bonds so issued for these and other bonds retired, was $4,402,000, and $3,740,000 of them were sold at such premium as to enable the company to keep the balance of $662,000 as a valuable asset. * * * *

NEW CONSTRUCTION.

"Aside from the work done west of the Missouri River, by the Fremont, Elkhorn & Missouri Valley Railroad Co. and its extension, a description of which is given in supplementary pages of this report, the amount of new railroad constructed during the year was comparatively small; but one short line of 28 4 miles was built (the Yankton Branch of the Dakota Central Railway, extending from Centreville to Yankton,, and this upon the strong solicitations of the citizens of Yankton, who desired a direct connection with our system of roads, and furnished aid towards the construction of the branch.

"About three miles of terminal railroad were constructed, and additional depot facilities obtained for the better accommodation of business at the city of La Crosse, to which important point access has heretofore been had through trackage arrangements with the Green Bay, Winona & St. Paul Co.

"The Northern Illinois Railway (coal road), which was well progressed in the preceding year, and fully explained in last annual report, was also completed and opened for traffic.

GENERAL REMARKS.

"It will be remembered that authority was given by the stockholders, at their annual meeting in 1879, for the issue of $15,000,000 of bonds of this company, which have since been known as the Chicago & Northwestern sinking fund bonds, secured by a deposit with the trustee thereof of the first-mortgage bonds of other railroad and railway companies whose roads should be built or acquired, at a rate of issue not exceeding $15,000,000 per mile; this issue was filled up during the fiscal year just ended, and a recitation of the mileage of railroads comprehended in the schems will be sufficient to show the wonderful development of the country in the last seven years, the wide range of communication opened up by these lines, and their importance to the public and to the older works of this company. The amount of railroad that has been added to the company's system under this arrangement is 1,029 miles, as follows : 429 miles in Iowa ; 373 miles in Dakota ; 57 miles in Minnesota ; 165 miles in Wisconsin and Michigan, and 5 miles in Illinois—all of which are subject to the trust of the $15,000,000 issue, at the average rate of $14,577 per mile. It has been necessary, however, to equip these roads with a large number of engines and cars, sufficient not only for their own business, but also for the working of the joint traffic over the older lines of the company, and considerable expenditure in this direction for their benefit, not included in their mortgage cost, has been made from time to time by the Chicago & Northwestern Railway Co. for a number of years past to meet this requirement.

"A similar trust to the foregoing, but of larger scope, to provide for any increased cost of construction and adequate equipment, which had been adopted by the board of directors, was presented to the stockholders for their action at the last annual meeting of the company, held in Chicago June 3 last, and was by them approved and confirmed and the issue of bonds thereunder authorized. This trust, which is made to the Union Trust Co. of New York, and dated April 15, 1886, provides for the issue of an amount not exceeding $20,000,000 of bonds, entitled Chicago & Northwestern Railway Co. extension bonds of 1886, to run until Aug. 15, 1926, bearing such rate of interest, payable semi-annually, as shall be stated in the bond, not, however, exceeding 5 per cent. per annum ; and the bonds are to be secured by a deposit, with the Trustee, of the first-mortgage bonds of other railroad and railway companies whose roads may be hereafter constructed or acquired. The portion of these bonds that may be issued for new railroad the ensuing year will bear but 4 per cent. interest.

"The construction of several pieces of road to fill up intermediate gaps in existing lines, and some extensions of moderate cost, have been begun. A link of 15¼ miles, from Lake City to Wall Lake, Ia., of the Toledo & Northwestern Railroad, and one of 20¼ miles, from Mapleton to Onawa, Ia., called the Maple Valley Railway, are in progress; also an extension of the Dakota Central Railway in the James River Valley, from its present terminus at Columbia, northerly to a connection with a branch of the Northern Pacific at Hudson, Dak., requiring about 38 miles of railroad; and the grading has been let of another extension of the Dakota Central Railroad from Redfield, westerly to Gettysburg, Dak., a distance of about 75 miles, but the whole work is not expected to be completed the present year."

The reports for the proprietary lines west of the Missouri River (not included above) are as follows :

SIOUX CITY & PACIFIC.

This road has 107.42 miles of road, showing no change from the preceding year. The income account was as follows:

	1885-86.	1884-85.
Gross earnings	$508,776	$583,534
Expenses	224,299	417,659
Net earnings	$284,478	$165,875
Profit and loss, credit		37,983
Total net income	$284.478	$203,858
Charges	191,907	239,618
Surplus or deficit	S. $92,571	D. $35,760
Debit balance, May 31, 1885	1,590,005	1,554,245
Debit balance, May 31, 1886	$1,497,434	$1,590,005

This company has $1,628,000 first-mortgage 6s; $1,628,-320 government lien 6s, and $169,000 preferred stock, on which 7 per cent. is paid.

FREMONT, ELKHORN & MISSOURI VALLEY.

This company has 502.80 miles of road, an increase of 191.80 miles during the year. The income account was as follows:

	1885-86.	1884-85.
Gross earnings	$1,737.076	$845,076
Expenses	853,158	470 601
Net earnings	$883 918	374.475
Charges, interest, etc	402,459	252,536
Net income	$481,459	$121,939
Income account, debit from previous year	57,272	179,211
Income account, balance, May 31, 1886	424,187	*$57,272

* Debit balance.

This company has $7,725,000 consolidated 6 per cent. bonds and $401,000 car trust bonds, an increase of $2,000,-000 consols.

The report says : "The Fremont, Elkhorn & Missouri Valley Co. completed an extension, which had been begun in the preceding year, from Valentine, Neb., west to Chadron, 136.7 miles, and from Chadron north toward the Black Hills, to Buffalo Gap, 55.6 miles ; total, 192.3 miles during the year ; and the company is now engaged in the further extension of the Black Hills Branch from Buffalo Gap north to Rapid City, an additional distance of 48 miles, which extension will be completed by the time of the publication of this report. The company is also constructing two branches in eastern Nebraska ; one from Fremont to Lincoln, about 52 miles, and one from Scribner to Shell Creek, 63.2 miles. An extension of the main line is in progress from Chadron to Douglas, near Fort Fetterman, in Wyoming Territory, a distance of about 139 miles, and 86 miles of the track have been laid. That part of the line lying west of the boundary of Nebraska is constructed by an organization under the laws of Wyoming Territory called the Wyoming Central Railway Co. The cost of the lines completed within the year, with their equipment, has been borne by the Fremont, Elkhorn & Missouri Valley Railroad Co., from proceeds of its sales of bonds, and by temporary use of its net earnings, after payment of operating expenses, taxes and fixed charges out of the current operating revenue of the company."

Norfolk & Western.

This company owns a main line from Norfolk, Va., to Bristol, 408 miles; the City Point Branch, 10 miles; the Saltville Branch, 10 miles; the New River Division, 75 miles; short branches to coal mines, 7 miles; a total of 510 miles of road, with 84.1 miles of sidings. The report is for the year ending Dec. 31.

Work was begun during the year on the Cripple Creek Extension, 23 miles, in the mineral region in Southwest Virginia.

The equipment consists of 128 locomotives; 33 passenger, 2 sleeping, 2 combination, 10 baggage and 7 mail cars; 1,148 box, 295 stock, 366 flat, 1,550 gondola and 75 caboose cars; 2 officers' cars, 1 pay car, 17 service cars and 149 hand and push cars.

A comparative statement of the capital account for two years is as follows :

	1885	1884
Liabilities :		
Capital stock, preferred	$18,000,000	$18,000,000
" " common	7,000,000	7,000,000
Funded debt	17,309,600	16,850,600
Car trusts	1,506,524	1,651,812
Accrued interest on funded debt	306,365	296,285
Bills payable and loans on collateral	227,620	291,710
Accounts payable (current balances)	257,134	307.597
Surplus of income	73,007	513,390
Total liabilities	$44,680,251	$44,911,394
Assets :		
Railroad property and franchises	$37,720,800	$33.114,853
Rolling stock	2,3E9,292	2,237,960
Car trusts	1,506,524	1,651,812
Materials and supplies	124.424	107.856
Stocks and bonds owned	1,758,921	6,687.988
Bills receivable	159,140	310,769
Accounts receivable (current balances)	570,893	315,743
Suspense account	173,028	....
Cash	267,229	149,413
Total assets	$44,680,251	$44,911,394

The funded debt includes $496,000 Norfolk & Petersburg

bonds; $1,544,100 Southside bonds; $2,045,500 Virginia & Tennessee bonds; $6,699,000 general mortgage bonds; $2,000,000 New River Division firsts; $2,500,000 improvement and extension bonds; $1,500,000 adjustment bonds; $525,000 convertible debentures and dividend scrip.

The earnings for the year were as follows :

	1885.	1884.	Inc. or Dec.	P. c.
Freight	$2,138,120	$2,025,087	I. $113,033	5.6
Passengers	458,445	521,191	D. 62,746	12.0
Mail and express	116,846	117,686	D. 840	0.7
Miscellaneous	57,710	47,189	I. 10,521	22.4
Total	$2,771,121	$2,711,153	I. $59,968	2.2
Expenses	1,649,292	1,516,858	I. 132,434	8.7
Net earnings	$1,121,829	$1,194 295	D. $72,466	6.1
Gross earn. per mile.	5,434	5,390	I. 44	0.8
Net " " "	2 200	2,374	D. 174	7.3
Per cent. of exps	59.5	55.9	I. 3.6	...

The small increase in earnings was on a very large increase in traffic carried at much lower rates, as shown below.

The division of expenses was as follows :

	1885. Amount.	P. c.	1884. Amount.	P. c.
Conducting transportation	$576,236	20.8	$539.134	19.9
Motive power	455,075	16.4	409,533	15.1
Maintenance of cars	138 839	5.0	116,087	4.3
Maintenance of way	255,149	9.2	232,977	8.6
General expenses	127,993	4.6	139,123	5.1
Taxes	96,000	3.5	80,004	2.9
Total	$1,649,292	59 5	$1,516,858	55.9

Renewals for the year included 4.6 miles of new steel rails and many improvements in track, buildings and bridges. A number of the bridges were strengthened sufficiently to carry the new heavy engines now in use on the road.

The result of the year was as follows :

Net earnings, as above		$1,121,829
Interest on bonds	$1,028,035	
" " car trusts	84,811	
" and discount, balance	27,145	
Deficit of Roanoke Machine Works	55,698	
Cost of extending bonds, etc	16.523	
		1,212,212
Deficit for the year		$90,383
Surplus from previous years	$513,390	
Less charged off for depreciation	350,000	
		163,390
Surplus, Dec. 31, 1885		$73,007

The amount charged off for depreciation above is for reduction of value in the company's investments in the Shenandoah Valley and other connecting lines.

The traffic for the year was as follows:

	1885.	1884.	Inc or Dec.	P. c.
Passengers carried	388,087	412,452	D. 24,365	5.9
Passenger-miles	19,151,534	19,213,251	D. 61,717	0.3
Tons freight carr'd	1.199,790	892,512	I. 307·278	34 4
Ton-miles	295,788,872	171,773,275	I. 124,015,597	72.2

The increase in freight traffic was in coal, coke, iron ore and similar freights, chiefly resulting from the development of the mineral region on the New River Division.

The average rates received were, in cents:

	1885.	1884	Decrease.	P. c.
Per passenger-mile, rate	3 027	3.362	0.335	9.9
" " " cost	1.777	1.963	0.186	9 3
" " " net	1.250	1 399	0.149	10.6
Per ton-mile, rate	0.741	1.202	0.461	38 4
" " cost	0.443	0 663	0.220	33.2
" " net	0.298	0.539	0.241	44.6

The great decrease in freight rates was due to the large increase in coal and other coarse freights, which were necessarily carried at very low rates.

The train and car mileage for the year was as follows :

	1885.	1884.	Inc. or Dec.	P. c.
Passenger train miles	572.681	595,116	D. 22.435	3.7
Freight train miles	1,684,039	1,340,923	I. 343,116	25.6
Total locomotive miles	2.748,166	2,402,303	I. 345,863	14.4
Passenger car miles	2,786,436	2,863 556	D. 77 120	2.7
Freight car miles	36,741,531	24,176,639	I. 12,564,892	52.0
Av. train load :				
Passengers, No	33 4	32.3	I. 1.1	3.4
Freight, tons	175.7	128.1	I. 47.6	37.2

Of the freight car mileage last year 60.5 per cent. was of loaded cars. Locomotives ran 1.22 miles to each revenue train mile. The average train was 3.9 passenger or 17.4 freight cars. The consumption of coal was, per passenger car mile, 9.6 lbs.; per freight car mile, 3.9 lbs. Locomotive service cost 12.94 cents per mile run.

The total expenditure for extensions and improvements, terminal property at Norfolk and payments on car trusts was $413,807, which was provided for by the additional issue of $459,000 improvement and extension bonds. To provide for the change of gauge (costing $165,000), the building of the Cripple Creek Extension and other necessary improvements, about $670,000 are needed in the current year. This will be provided by a further issue of the improvement and extension bonds.

The building of the coal piers at Lambert's Point, near Norfolk, has given the company excellent shipping facilities, and enabled it to introduce its Flat Top coal into the general market.

The President's report says : "The advantages to accrue to the public and to railroad interests from the adoption of a uniform gauge throughout the country are everywhere recognized, and such a change has long been in contemplation. The principal companies in the southern states, whose roads are of 5 ft. gauge, have recently resolved upon a change to standard guage, which will be made June 1, 1886. [This change is now completed.] The location of your road with regard to its connections renders it absolutely necessary to conform to the change. Of the 11 lines now crossing or connecting with your line, anly two are identical with it in gauge. With two others, cars are interchanged by using steam hoists, by means of which the trucks are changed. The advantages to your company from the change of gauge cannot be overestimated ; it will relieve it from the expense incident to maintaining and operating the steam transfer apparatus and it will facilitate and encourage the interchange of business with roads with which little or no business has heretofore been done. It will further benefit your line by largely increasing the territory tributary to it and by opening up new markets for the coal mined on your New River Division.

"As the necessity for a change of gauge has long been admitted, all rolling stock added of late years has been so constructed that it could be readily adapted to the standard gauge. Your company, however, owns a number of very old engines of small power and of obsolete patterns which are used almost exclusively on the Eastern Division, where the light grades and straight lines, though favorable to the use of heavy engines, made it possible to continue in service the old engines, which are now rapidly becoming unserviceable. It has been decided to withdraw them from service and to acquire a lesser number of powerful consolidation engines of your company's standard type ; thereby decreasing the number of engine crews and otherwise conducing to economy.

"The economy of using powerful engines, such as have heretofore been used only on the Western Division, is shown in the fact that while the ton-mileage of the whole line increased 72 per cent in 1885, as compared with 1884, the freight train mileage increased but 22 per cent. The proportion of train mileage will be further largely decreased by using on the Eastern Division the heavy engines to be acquired under the projected change in the motive power; to accomplish this end it is necessary to replace the present superstructure of the High Bridge (2,350 ft. long and 130 ft. high) near Farmville, with one capable of bearing the heaviest engines and trains. This work has been contracted for at a cost of $62,000. Heavy engines and long trains will thus be possible on the whole line, and traffic will be handled efficiently and economically.

"The total expense incident to the change of gauge, including the new superstructure to the High Bridge, alterations to equipment, new equipment, etc., has been estimated at $309,000, of which during 1886 it is estimated $165,000 will be charged against improvement and extension accounts.

"The steady and continuous growth of the business of the company, the use of heavier engines, and the increase in the length of trains have made it necessary from time to time to provide new sidings, additions to sidings already in use, increased yard room, station buildings and terminal facilities. Should this increase in business continue, similar betterments to the estimated cost of $125,000 will be required during the ensuing year."

Denver & Rio Grande.

The road owned by this company includes 1,317 miles of main line and branches (of 3 ft. gauge) in Colorado. From July 12, 1884, it has been in possession of Mr. Wm. S. Jackson as Receiver in suits for foreclosure. Mr. Jackson has issued a report covering the period from July 12, 1884, to Dec. 31, 1885, but has given in that report statistics for the full years 1885 and 1884, so as to admit comparisons with former years.

Up to the date of the receivership the company operated the Denver & Rio Grande Western (Utah lines), but since that time the Utah road has been operated by a separate receiver.

Since the report was issued the road has been sold under foreclosure, and the bondholders who bought it have completed the organization of a new company.

The equipment consists of 210 locomotives ; 67 passenger, 31 combination, 10 chair, 2 observation, 7 immigrant sleeping, 8 postal, 25 baggage and 20 express cars ; 50 refrigerator, 2,604 box, 442 stock, 12 fruit, 3 oil tank, 1,452 coal, 1,026 flat and 83 caboose cars ; 3 provision and 14 business cars, 96 construction, 3 wrecking and 14 water cars.

The earnings of the road (Colorado lines, 1,317 miles), for the year ending Dec. 31 were :

	1885.	1884.	Inc. or Dec.	P.c.
Freight	$4,580,491	$3,980,456	I. $600,035	15.1
Passengers	1,086,656	1,129,652	D. 42,996	3.8
Mail and express	409.862	361,108	I. 48,754	13.5
Miscellaneous	42,045	80.888	D. 38,843	48.0
Total	$6,119,054	$5,552,104	I. $566.950	12.1
Expenses	3 935,274	3,758,530	I. 176,744	4.7
Net earnings	$2,183.780	$1,793,574	I. $390,206	21.7
Gross earn. per mile	4,646	4,216	I. 430	12.1
Net " "	1 658	1.362	I. 296	21.7
Per cent. of exps	64.3	67.7	D. 3.4	....

Taxes and insurance are not included in expenses. The expenses for 1885 include $11,640 due directly to a strike.

The division of expenses was as follows :

	1885. Amount.	P.c.	1884. Amount.	P.c.
Maintenance, road and buildings	$1,279,646	20.9	$1,103,185	19.9
Maintenance rolling stock	537.646	8.8	477,517	8.6
Conducting transportation	1,756.075	28.7	1,663,717	30.0
Gen. and contingent exps	361,907	5.9	514,111	9.2
Total	$3,535,274	64 3	$3,758,530	67.7

In the above statements, as before noted, the Utah lines (Denver & Rio Grande Western), are not included. The earnings for 1884, including the Utah lines, were $5,928,919; expenses $4,335,576; net earnings, $1,593,343.

The traffic for the year was as follows :

	1885.	1884.	Inc. or Dec.	P.c.
Pas. train miles	1.190,178	1,165,128	I. 25,050	2.1
Freight " "	1,565,233	1,479,607	I 85.626	5.8
Pas. car miles	5.075,656	5,433,512	D. 357,856	6.6
Freight car miles	31,715,154	27,610,866	I. 4,104,288	14.9
Pas. carried	250,741	264.417	D. 13,676	5.1
Passenger-miles	26,124.126	26,101,932	I. 22,194	0 1
Tons freight car	1,207,897	1,034 849	I. 173.048	16.7
Ton-miles	168,631,765	137,104,523	I. 31,527,212	22.9
Av. train load :				
Passengers, No	21.9	22.4	D. 0.5	2 2
Freight, tons	107.7	92.7	I. 15.0	16.1

Of the freight car mileage last year 71.2 per cent. was of loaded cars. The average passenger journey was 104.2 miles ; the average freight haul was 139.6 miles.

The average earnings and expenses per train-mile and per unit of traffic were, in cents :

	Train-mile. 1885.	1884.	Car-mile. 1885.	1884.	Pass. or ton-mile. 1885.	1884.
Passenger :						
Receipt	125 70	127 80	.....	.....	4.16	4.33
Cost	119 60	115.50	.....	.....	4 17	3.93
Net	6.10	12.30	.....	.....	*0.01	0.40
Freight :						
Receipt	292.00	269.90	14.44	14.42	2.72	2.90
Cost	160.00	163.00	7.92	8.74	1.49	1.76
Net	132.00	106.00	6.52	5.68	1.23	1.14

* Deficit.

Locomotives ran in all 1,580,554 miles in passenger service, and 2,800,909 miles in freight service. The cost of motive power was 15.14 cents per mile run. The nature of the service on a mountain road is shown by the statement that there were 1.33 engines per passenger train-mile and 1.79 per freight train-mile.

The Receiver's account for the period from July 12, 1884, to Dec. 31, 1885, is as follows:

Earnings of road		$8,872,051
Expenses (63.5 per cent.)		5,629,676
Net earnings		$3,242,375
Rents, etc		101,631
Total		$3,344,006
Taxes and insurance	$450,889	
Betterments of road	504,001	
		963,890
Balance		$2,380,116

The Receiver has paid debts of the Denver & Rio Grande Co. to the amount of $2,678,445, and has collected assets of the company amounting to $974,020, leaving a balance in his favor of $1,704,425. Deducting this amount from the balance above there remained (Dec. 31, 1885) a balance of $675,691, which was represented by cash, materials, securities and surplus of accounts receivable over accounts payable.

The Receiver says : "The accompanying statistics regarding the operation of the Denver & Rio Grande Railway, are published for convenient reference and to complete the files of the annual reports. I took charge of the business of the road under the orders of the Hon. Moses Hallett, Judge of the Federal Court of the District of Colorado, on July 12, 1884. No report of the operations of the company has been issued for the year 1884. I have, therefore, added statistics for that portion of the year 1884 prior to July 12, when the road was under the management of the company, and have also made comparisons between the years 1884 and 1885.

"The statistics have been compiled with the view of making them self-explanatory, as far as possible, and it is hoped that an examination of them will enable all interested to reach intelligent conclusions. Great care has been exercised to prevent any charges to betterments which properly belong to operating expenses. In the effort to charge everything to expenses which did not clearly represent an improvement in the property, it is believed that there has been some charges to that account which ought justly to have been charged to betterments. However, the amount is not large enough to merit more than a passing notice. The real value of a railroad is practically better shown by an exhibit of its net income than of its net earnings. A railroad with a growing business can never stop improvements. So long as there remains a balance to the credit of income after making good all depreciation, and after providing for taxes, insurance and fixed charges, there can be no uncertainty about its financial condition."

Cairo, Vincennes & Chicago.

This title includes the line from Danville, Ill., to Cairo, 265 miles, which was formerly the Cairo Division of the Wabash, St. Louis & Pacific. On April 27, 1885, the Wabash Receivers, by direction of the Court, surrendered this line to Messrs. Anthony J. Thomas and Charles Edward Tracy, Receivers and Trustees for the holders of the first mortgage on the line. These Receivers have since operated the road, and now submit a report covering the year ending April 30 last.

The earnings of the road for the year were as follows :

Freight	$323.839
Passengers	113,915
Mail and express	33,597
Miscellaneous	33,681
Total ($1,906 per mile)	$505,032
Expenses (85 2 per cent.)	430,413
Net earnings ($282 per mile)	$74,619
Interest on certificates	12,802
Net income	$61,817

Taxes are included in expenses ; they amounted to $34,864, or 6.9 per cent. of the gross earnings.

The report says : "The cost of transporting over our own line all the material used in reconstruction was charged to operating expenses, which were much increased thereby. On the other hand there was no compensating credit in earnings, as we did not charge any freight for such transportation.

"While we have refused to do business at an absolute loss, yet to re-establish the industries located on the line—which the practice of our predecessors had allowed to fall into decay—and to build up new ones, we deemed it sound policy to make large concessions in freight charges to enable our patrons to offer prices that would draw back their old customers who had been alienated from our district and also bring in new ones. These concessions, and the ruinously low rates of prevalent through the whole country during the year under report, seriously diminished our gross earnings."

The Receivers' balance sheet, condensed, is as follows :

Receivers' certificates, 6 per cent		$622 668
Vouchers, pay-rolls and current balances		117.299
Net income from the road		61,817
Total		$801,784
Reconstruction and new equipment	$593,041	
Accounts and balances receivable	50,276	
Supplies	11,588	
Due from Wabash Receivers for back taxes	49,068	
Cash on hand	97,781	
		801,784

The total cost of reconstruction was $651,054, from which is deducted $58,013 for old material sold. There are still on hand 6,000 tons of old iron rails unsold.

The Receivers report that the road was a wreck when they took possession. Messrs. J. S. Morgan & Co. advanced them $622,668 on receivers' certificates at 6 per cent., and enabled them to buy materials when prices were lowest.

Renewals and rebuilding included 15,300 tons steel rails; 73,450 new ties; 8,490 ft. of new bridging and 1,576 ft. new upper work on bridges; 36,834 ft. of new piling; 18 miles new sidings; 8 miles of ballast and a general reconstruction of buildings. To equipment there were added 3 locomotives, 4 passenger, 2 baggage, 150 box and 50 coal cars and a pile driver; 17 locomotives and 411 cars have been rebuilt and large additions made to the shop tools.

There are now in the road 163 miles of track laid with new steel rails; 47 with old but good steel; 27 with poor steel, and 28 miles with iron. The 55 miles of poor rails should be replaced as soon as possible.

The condition of the road may be imagired from the statement that it cost $10,000 to clear the road of brush and vegetation, the growth of years.

Work has been begun on a new entrance into Cairo, which will avoid the many objections to the old line.

The Receivers anticipate a large business this fall from good crops along the line of the road.

The Receivers say, in concluding their report: "As substituted trustees of the mortgage securing your bonds, we have begun long since the necessary proceedings for foreclosure and obtaining a decree for a sale of the property.

"Our proceedings have been opposed by the Wabash Receivers with the claim that your property is chargeable with part of the indebtedness created during and by their management. We are prepared to show the falsity of the claim whenever it becomes necessary, but inasmuch as your property was not included in the lines of railway recently sold as the Wabash System, we think that the managers of the Wabash reorganization will find themselves in a position in which they cannot further urge it. In the meantime, and until the claim is disposed of, your property enjoys the full protection which comes from the possession and use of it in the name of the Court. For the present it seems to us wiser not to disturb the existing state of things.

"As Committee of Reorganization, we beg to report that out of the total issue of $3,857,000, Wabash, St. Louis & Pacific Railway Co. Cairo Division bonds, holders of $3,807,000 of said bonds have assented in writing to the reorganization scheme and deposited their bonds with Messrs. J. S. Morgan & Co., or their agents, Messrs. Drexel, Morgan & Co., subject to the order of the Committee. This leaves but $50,000 of bonds unassented and outstanding. The bonds deposited in London have been transmitted to America, and the entire $3,807,000 are now in the hands of Messrs. Drexel, Morgan & Co., New York, ready for presentation to the Court when required."